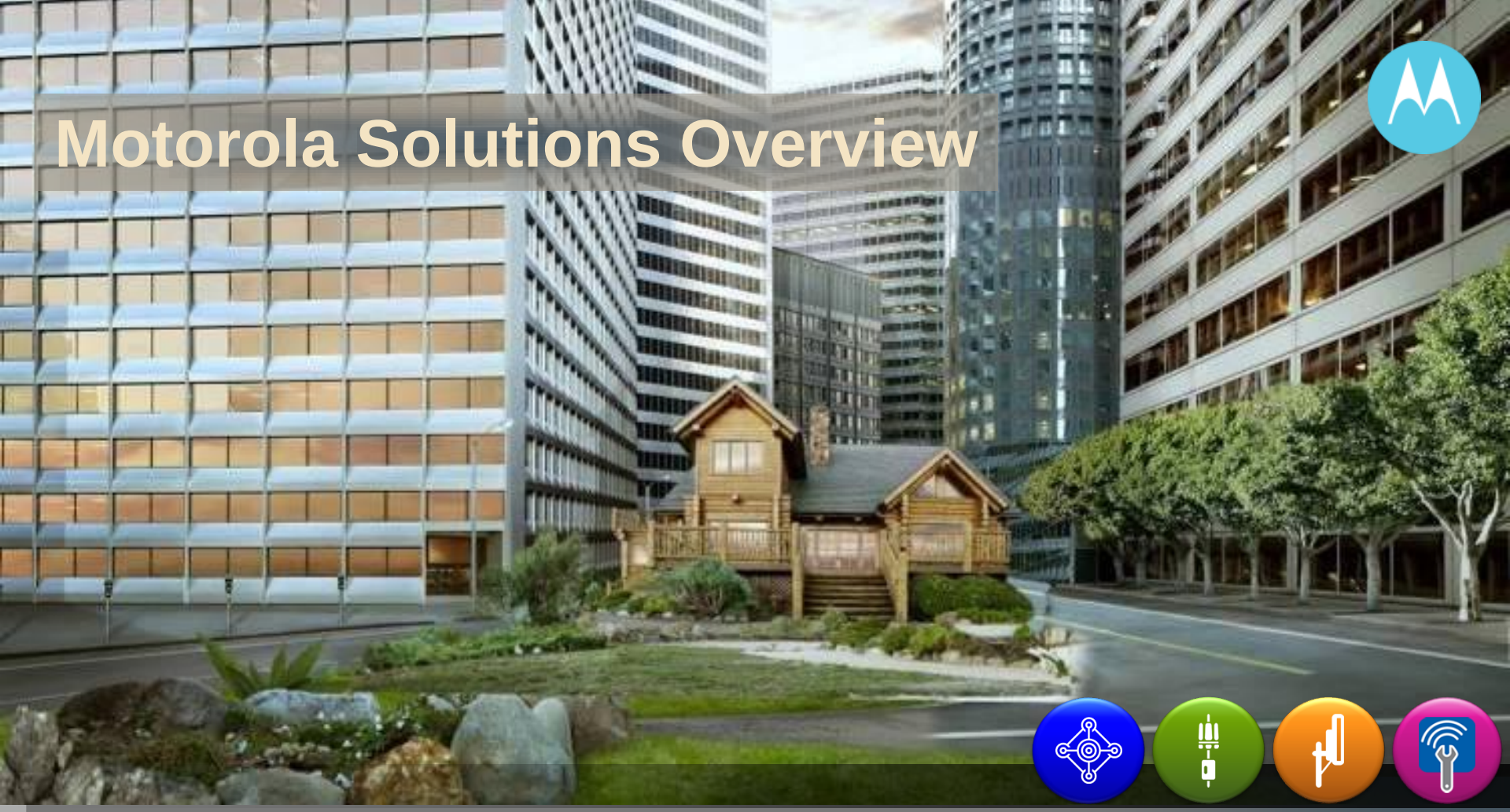


Motorola Solutions Overview

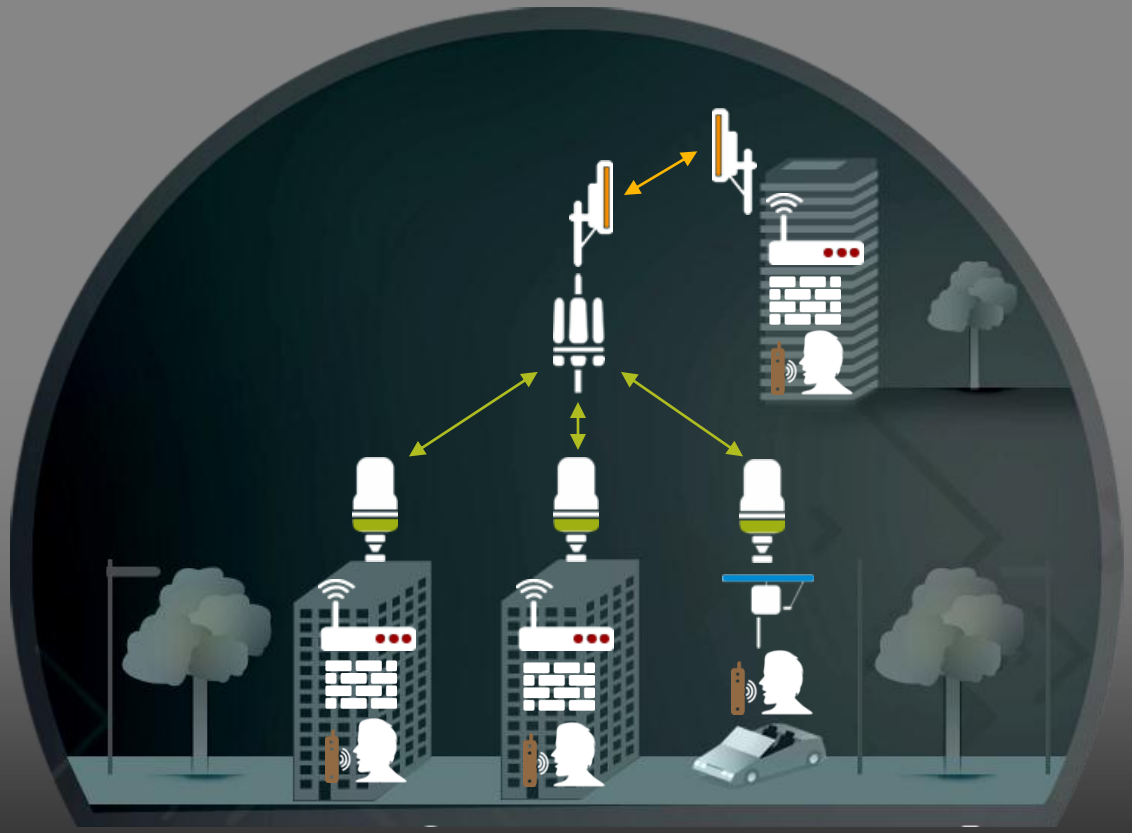
Wojciech Labocha
Mostar 07.04.2011

Motorola Indoor/Outdoor Wireless Networks

One Point Wireless Suite

One Point Wireless Suite
Design, Deploy and Manage

AirDefense
Security, Intrusion Protection



Point-to-Point
Backhaul Layer

Point-to-Multipoint
Distribution Layer

Mesh Network
Access Layer

VoWLAN
Access Layer

Indoor WLAN
Access Layer

High-Level Layered Network Architecture

The Wireless Services Architecture

All Wireless

Mobile

Lower Cost

Simplified

More Secure

Backhaul Layer

Point-to-Point Wireless Bridges
10Km - 100Km

Distribution Layer

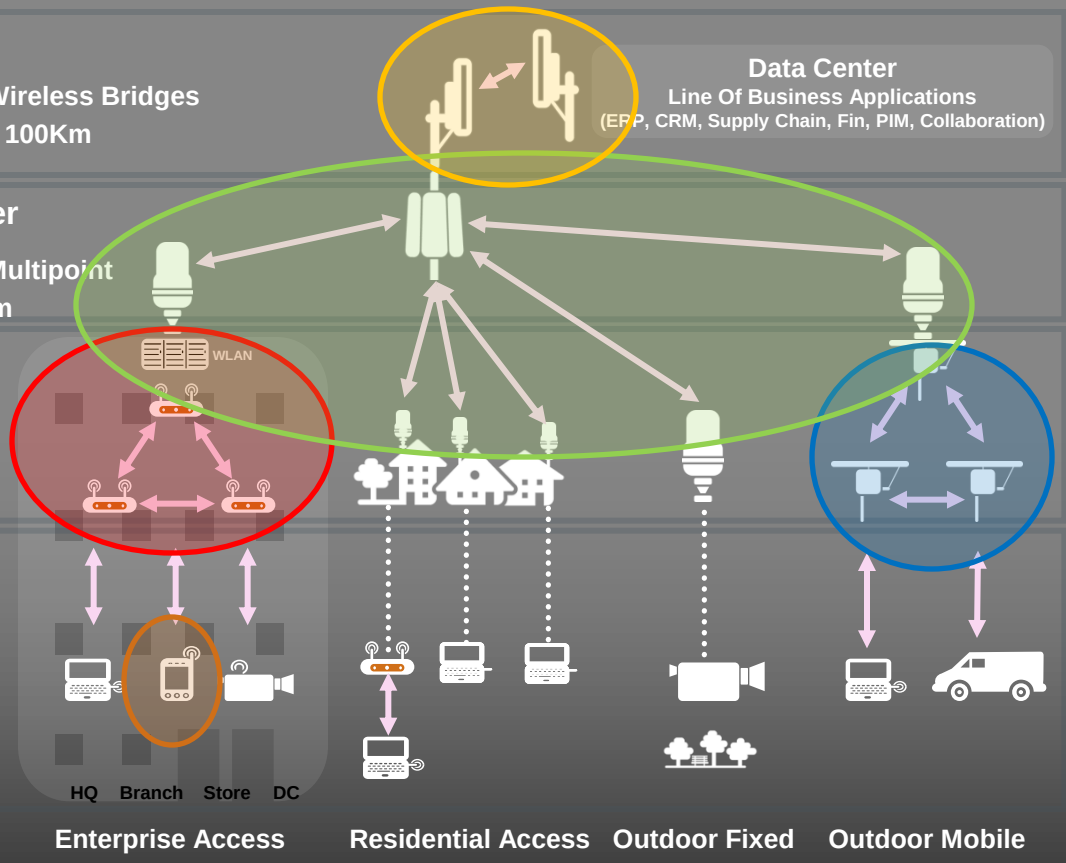
Wireless Point-to-Multipoint
1Km - 10Km

Access Layer

Mesh WLAN
PMP
Mesh Outdoor
100m – 1Km

Client Devices

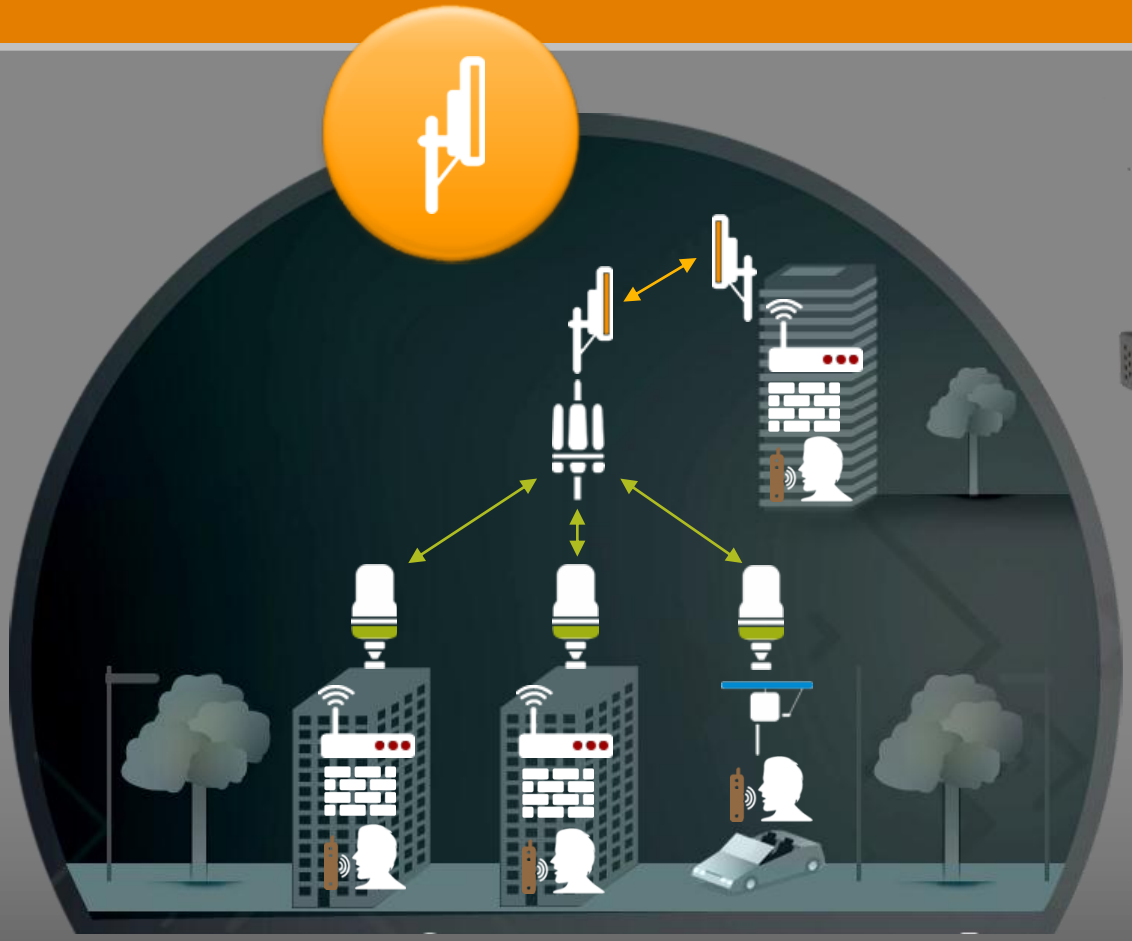
Rugged/Std Laptops
VoWLAN phones
Mobile Computers
Vehicles
Cameras



Wireless Network Design and Management

Network and Device Security

Point-to-Point (PTP) Backhaul



Point-to-Point
Backhaul Layer

High Capacity – 300 Mbps

Long Distance – 155 miles (250 km)

LOS or NLOS

Licensed and Unlicensed

Tens of Thousands of Deployments Globally

Value Proposition

Value Proposition

→ Market share leading fixed outdoor point-to-point connectivity and backhaul systems that operate in the unlicensed, shared and licensed

Key Features

→ Throughputs from 7 Mbps to 368 Mbps full duplex

→ Carrier Grade reliability - Up to 99.999% availability

→ Industry leading technical feature set

- ⊙ Highest system gain
- ⊙ Best in class sensitivity and power output
- ⊙ Highest Spectral Efficiency
- ⊙ Unique Combination of MIMO, i-DFS, Adaptive Modulation
- ⊙ Globally Popular and Demanded LINKPlanner Tool

→ Up to 255 Miles (250 km)

→ Ability to connect in NLoS and extreme weather conditions

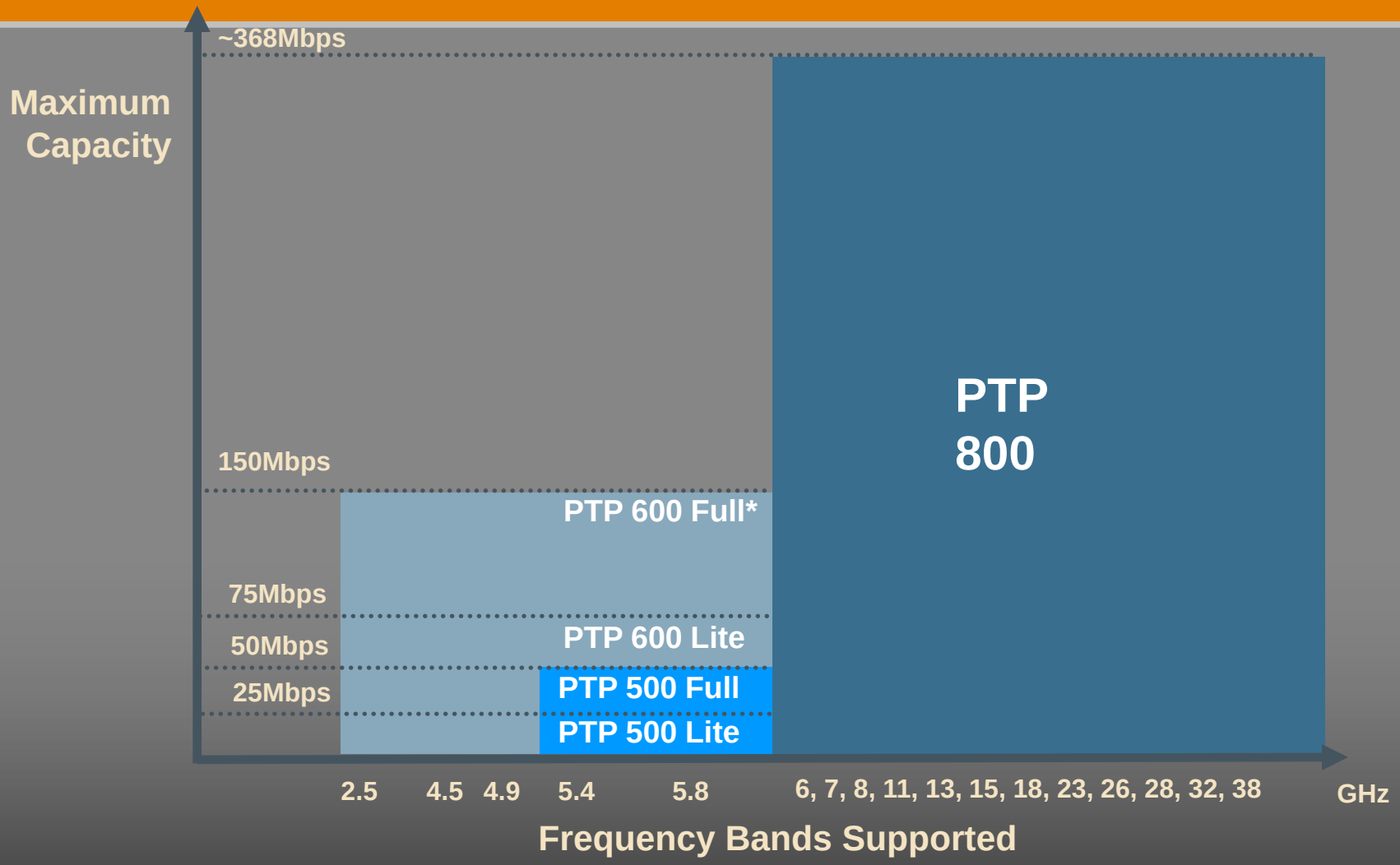
PTP Portfolio

	PTP 100	PTP 200	PTP 300	PTP 500	PTP 600	PTP 800
Data Rate (Mbps)	Lite: 7.5 Full: 14	21	NLOS: 25 LOS: 50	Lite: 52 Full: 105	Lite: 150 Full: 300	10 - 368
LOS Range (Max)	35 mi 56 km	5 mi 8 km	155 mi 250 km	155 mi 250 km	124 mi 200 km	Depends on link budget and environment
Frequency Bands (GHz)	2.4, 5.2, 5.4, 5.8	5.4	5.4, 5.8	5.4, 5.8	2.5, 4.5, 4.8, 4.9, 5.4, 5.8	11, 18, 23, 26 with additional frequencies in development

PTP Solutions Portfolio
Licensed vs Unlicensed

	PTP 300-500-600	PTP 800
Regulations	2.5, 4.4-4.6, 4.8, 4.9, 5.4, 5.8, 5.9GHz	6GHz – 38GHz
Multiplexing	Time Division/ Semi FDD	Frequency Division
Duplex	Half	Full
Physical	Integrated outdoor unit	Split Mount – Outdoor Radio Unit Indoor Compact Modem Unit
Cabling	Shielded Category 5e	Intermediate Frequency (IF)
Ports	100/1000BaseT (optional fiber port and T1's on PTP600)	100Base T, 1000BaseT, Optional Fiber Port
Management	In-Band	Out-of-band or In-Band
Antenna	Dual Polarity integrated or external	Single and dual (requires 2 radios) polarity external
Path	LOS, NLOS and nLOS	LOS only

PTP Solutions Portfolio



(Note: Throughputs always stated as Full Duplex in Licensed Microwave market)

PTP 300/500/600 Components

Complete “hop in a box”

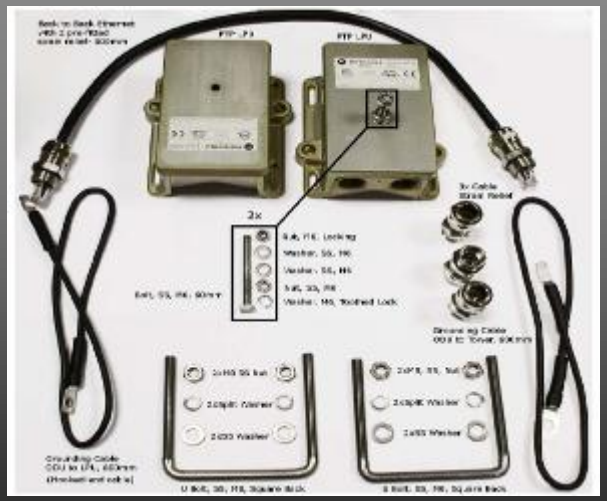
Equipment provided

- ✓ 2 x Outdoor Units (ODU)
- ✓ 2 x Indoor Units (P-IDU Plus)
- ✓ Built-in Network Management System
- ✓ HW Mounting
- ✓ PTP LINKPlanner Software

Customer provides

- ✓ CAT 5e shielded outdoor cable - Superior Essex recommended
- ✓ External antennas (if applicable)
- ✓ 1x (PTP300/500) or 2x (PTP600) Motorola LPU (Lighting Protection Units)

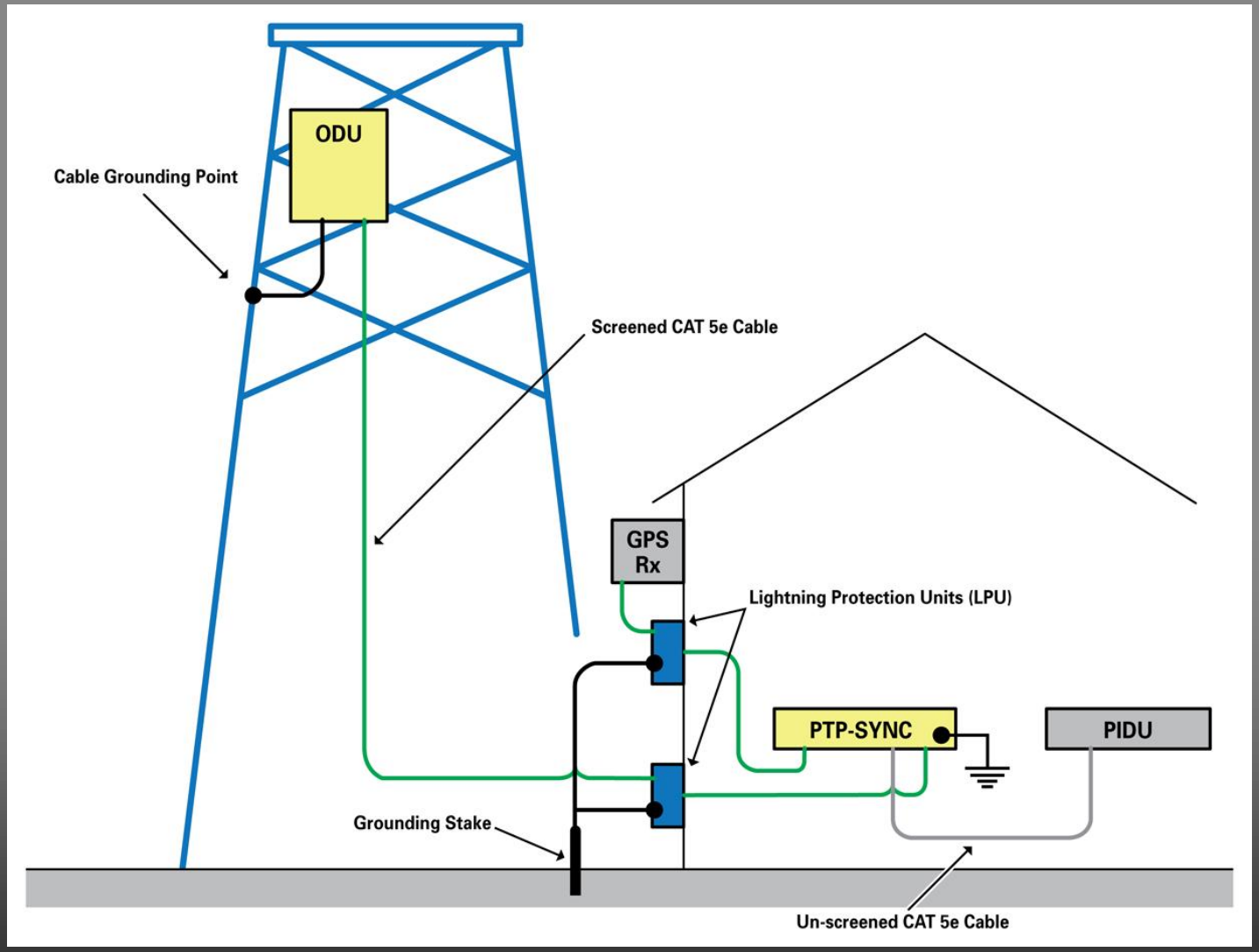
Note: PTP300/500 products have LPU circuitry built into the ODU so external LPU at the ODU is not required.



PTP-SYNC Key Features

- 1 Hz or 1 PPS (pulse per second) timing reference signal
- One PTP-SYNC unit per link
- Daisy chain up to 10 PTP-SYNC units
- Phantom powering via PIDU/ODU cable
- When multiple PTP 600 radios are deployed on two or more towers/rooftops, add an outdoor-mounted time module:
  - GPS receiver
  - Motorola CMM (with PMP systems)
  - Other synchronized 1 Hz timing device
- Up to 10 PTP-SYNC units can be connected to one time module

Sample Configuration



PTP 800 Series

- Portfolio Extension to Highly Successful PTP Portfolio

- Highly sought after by our customers requiring
  - Maximum reliability in a protected (licensed) environment
  - High throughput with low latency

- What are the Target Markets?
  - Enterprise
  - Municipal, University, Schools, Hospital
  - Public Safety
  - Carrier

Key Features

- 6 - 38GHz
- 7 - 56MHz channels, configurable
- Native Ethernet radio
  - ✓ GigE interface
- Scalable throughput, 10 - 368Mbps Full Duplex
  - ✓ Asymmetric throughput control by license key
- Latency < 115µs @ full capacity
- QPSK to 256QAM
  - ✓ Adaptive Modulation & Fixed Modulation
- In-Band and Out-of-band Management
- Industry smallest modem

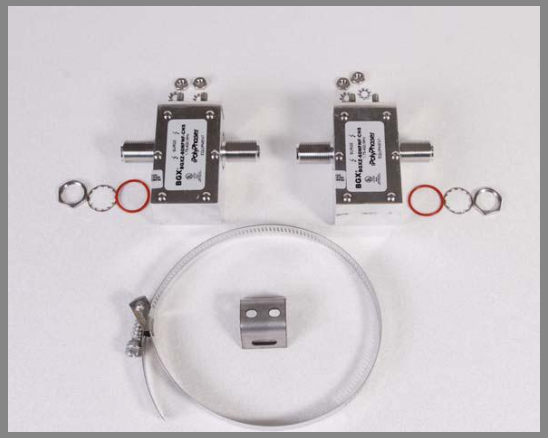
Key Features

- Layer 2 QoS - 802.1p served by eight level queues
- Optional 128 & 256 Bit AES Encryption (FIPS-197 compliant)
- Supports multiple deployment configurations
  - 1+0 - Standard Configuration
  - 2+0 - Double Configuration
    •Contains two independent links, allowing Double Throughput with Redundancy at Single Throughput. The responsibility of link aggregation, failover and fallback are completely depends on external switch provided by customer
  - 1+1 - Redundancy Configuration (Available Later)
    Hot Standby (HSB) configuration contains two links and provides full redundancy in case of hardware.
- LINKPlanner Software

PTP 800 System Components

Antenna

ODU (Outdoor Unit)



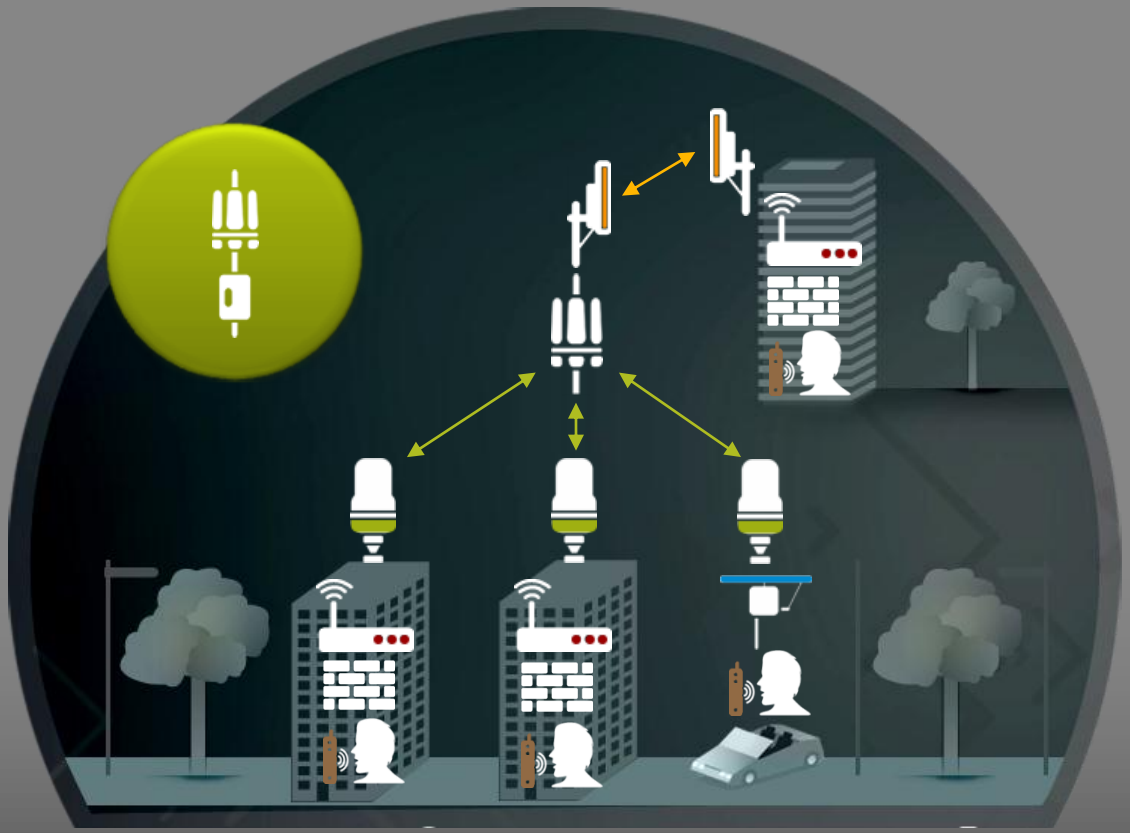
LPU
(Lightning Protection Unit)

IF Cable
(Intermediate Frequency)

CMU (Compact Modem Unit)

Accessories

Point-to-Multipoint (PMP) Access and Distribution



Point-to-Multipoint Distribution Layer

- Secure and Reliable
- Licensed and Unlicensed
- 802.16e and Proprietary
- Scalable
- 45 Mbps, LOS and nLOS
- Deployed in Over 120 Countries Globally

Point-to-Multipoint Value

Value Proposition

- Fixed outdoor connectivity for data, voice and video surveillance in the licensed and unlicensed spectrum

Key Features

- Up to 45 Mbps throughput per AP module
  - 180 Mbps from a four sector tower
- GPS synchronization
- Rapid installation of connectivity
- Applications
  - Data Transfer, Voice (VoIP), Video
- Low cost infrastructure
- Industry standard or proprietary
  - 802.16e WiMAX CPE compatibility
- Long range
- LOS and nLOS performance

PMP Portfolio

	PMP 120	PMP 120 900 MHZ	PMP 130	PMP 320	PMP 400	PMP 430
Radio Frequencies (GHz)	2.4, 5.1, 5.2, 5.4, 5.8, 5.9	900 MHz	2.4, 5.1, 5.2, 5.4, 5.8, 5.9	3.3, 3.5, 3.6	4.9, 5.4	5.4, 5.8
Useable Throughput (Mbps)	7	4	14	23 (up to 40 with MIMO B)	20	>40
Latency (msec)	3.5	<7.5	3.5	25	3.5	3.5
Security	• 56-bit DES • Optional 128-bit AES – FIPS 197 certified	• 56-bit DES • Optional 128-bit AES– FIPS 197 certified	• 56-bit DES • Optional 128-bit AES– FIPS 197 certified	128-bit AES– FIPS 197 certified	• 56-bit DES • Optional 128-bit AES – FIPS 197 certified	• 56-bit DES • Optional 128-bit AES – FIPS 197 certified
OFDM	N	N	N	Y	Y	Y

PMP 1x0 Overview

Typical Application	LOS connectivity for data, voice and video applications
Example Deployment	Service provider connects business and residential subscribers in a new location for data transfer and VoIP services
Spectrum	2.4, 5.1, 5.2, 5.4, 5.8 and 6.0 GHz
Performance	LOS
Total Throughput	7 or 14 Mbps per sector
Range	14 Mbps to 1 mile 7 Mbps to 2 miles Range can be extended with passive LESH and Reflector
Latency	3.5 msec one way
Security	DES, Optional 128/256-bit AES (FIPS 197 certified)

PMP 430 Overview

Typical Application	High capacity access network serving business and residential subscribers
Example Deployment	A service provider expands coverage area to connect a city not served by wired broadband solutions
Spectrum	5.4 and 5.8 GHz spectrum
Performance	LOS and nLOS performance
Total Throughput	>45 Mbps per sector
Range	>40 Mbps to 1.5 miles 28 Mbps to 4 miles 14 Mbps to 8 miles
Latency	3.5 msec one way
Security	DES, Optional 128/256-bit AES (FIPS 197 certified)

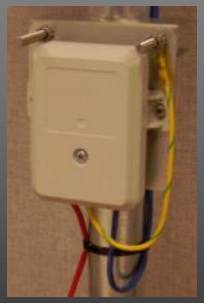
PMP 430 Specifications Overview

	PMP 430 (10MHz Channel)	PMP 430 (20MHz Channel)
Radio Frequencies	5.4, 5.8 GHz	5.4, 5.8 GHz
Useable Throughput	20 Mbps	40 Mbps
Latency (msec)	3.5	3.5
System Gain (dB)	• 5.4 GHz: 125 • 5.8 GHz: 134	• 5.4 GHz: 122 • 5.8 GHz: 131
System Gain with Passive LENS (dB)	• 5.4 GHz: 130 • 5.8 GHz: 140	• 5.4 GHz: 127 • 5.8 GHz: 137
System Gain with Passive Reflector (dB)	• 5.4 GHz: 133 • 5.8 GHz: 149	• 5.4 GHz: 130 • 5.8 GHz: 146
Channel Width (MHz)	10	20
Security	• 56-bit DES • Optional 128-bit AES – FIPS 197 certified	• 56-bit DES • Optional 128-bit AES – FIPS 197 certified
OFDM	Y	Y
Maximum Subscribers per Access Point	200	200
Access Point Sector	90^0	90^0

PMP 430 Product Description

CAP 58430
5.8 GHz OFDM Access Point

600SS Pole Mount Bracket



600SSC or 600SSD

CMM4
with 14-Port EtherWAN Switch

56 VDC Power Supply

CSM 58430
5.8 GHz OFDM Subscriber Module

29.5 VDC Power Supply

Four SM Models
Fixed Keys for Upgrades

Key Features Information	
Maximum Throughput :	4 Mbps Aggregate
MP Double Rate :	Enable

Key Features Information	
Maximum Throughput :	10 Mbps Aggregate
MP Double Rate :	Enable

Key Features Information	
Maximum Throughput :	20 Mbps Aggregate
MP Double Rate :	Enable

Key Features Information	
Maximum Throughput :	Unlimited
MP Double Rate :	Enable

PMP 430 Models

Four SM Models
- 4Mb
- 10 Mb
- 20 Mb
- 40 Mb

Two AP Kit Models
- Outside of US Model
- US Model

AP Connectorized without antenna
- Only available outside of US

CSM 58430 Model Number	5.8GHz OFDM Subscriber Module (SM) Description	DES or AES	Picture	Power 29.5 VDC Supply Type
5790SM4	5.8 GHz OFDM SM – 4 Mbps	DES		
5791SM4	5.8 GHz OFDM SM – 4 Mbps	AES		
5790SM10	5.8 GHz OFDM SM – 10 Mbps	DES		
5791SM10	5.8 GHz OFDM SM – 10 Mbps	AES		
5790SM20	5.8 GHz OFDM SM – 20 Mbps	DES		
5791SM20	5.8 GHz OFDM SM – 20 Mbps	AES		
5790SM40	5.8 GHz OFDM SM – 40 Mbps	DES		
5791SM40	5.8 GHz OFDM SM – 40 Mbps	AES		
CAP 58430 Model Number	**5.8GHz OFDM Access Point (AP) Description**	**DES or AES**	**Picture**	**CMM Type**
5780AP	5.8 GHz OFDM Connectorized AP w/antenna	DES		Requires CMM4 w/56 VDC supply
5780APUS	5.8 GHz OFDM Connectorized AP w/antenna - US Model	DES		Requires CMM4 w/56 VDC supply
5781AP	5.8 GHz OFDM Connectorized AP w/antenna	AES		Requires CMM4 w/56 VDC supply
5781APUS	5.8 GHz OFDM Connectorized AP w/antenna - US Model	AES		Requires CMM4 w/56 VDC supply
5780APC	5.8 GHz OFDM Connectorized AP – No antenna	DES		Requires CMM4 w/56 VDC supply
5781APC	5.8 GHz OFDM Connectorized AP - No antenna	AES		Requires CMM4 w/56 VDC supply

PMP 430 AP Specs

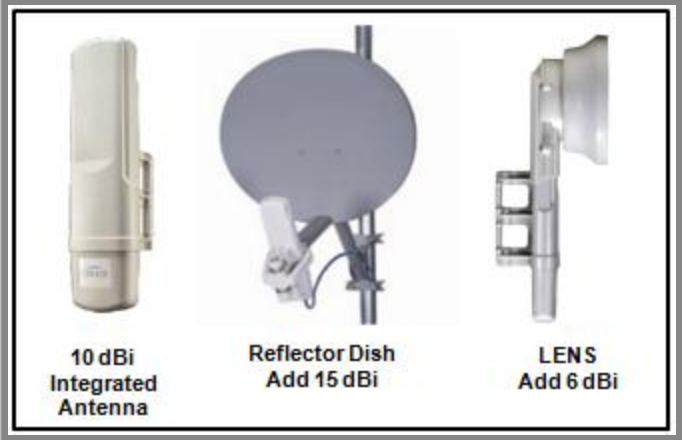
AP - radio and connectorized antenna kit
Model No 5780AP, 5781AP, 5780APUS, 5781APUS

90° sector - 60° x 5° -3 dB beam with near-in null fill
17 dBi gain antenna
Radio Transmit Output Power is -30 to 16 dBm (Release 10.0)
Radio Transmit Output Power is -30 to 19 dBm (Release 10.1)
10 MHz Channel – 17 + 16 gives max 33 dBm EIRP (Release 10.0)
20 MHz Channel -17 + 19 gives max 36 dBm EIRP (Release 10.1)
Under 13 W DC power (56 VDC)
6 kg, 71 x 21 x 28 cm

AP – Connectorized radio only
Model No 5780APC, 5781APC

Selected markets – Not available in US
-30 to 19 dBm Transmit Output Power
Under 13 W DC power (56 VDC)
1.3 kg, 33.7 x 21 x 11.13 cm

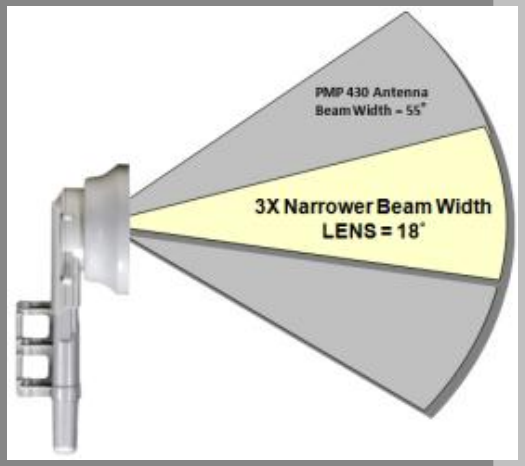
PMP430 SM Specs



SM - radio and int. ant.
Model No 5790SMx, 5791SMx

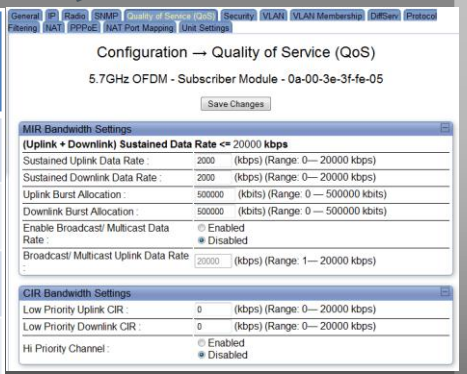
(x=4, 10, 20, 40)

10 dBi gain, 55° x 55° -3 dB beam
Optional LENS adds 6 dB
Optional Reflector Dish adds 15 dB
Auto TPC, set by AP (-30 to 19 dBm)
Under 13 W DC power (29.5 VDC)



MIR & CIR Ranges by SM Model – Configuration => QoS

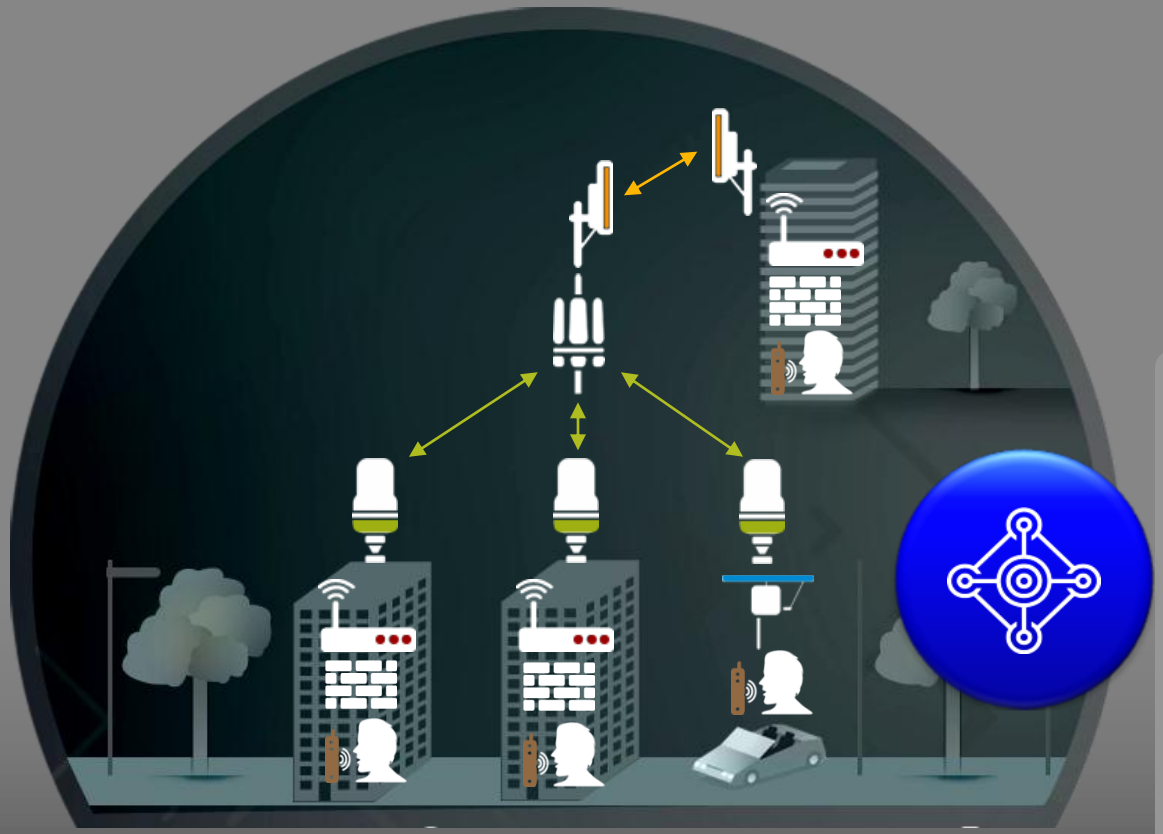
PMP 430 OFDM SM Aggregate Throughput	(Uplink + Downlink) Sustained Data Rate	MIR - Sustained Uplink Data Rate	MIR - Sustained Downlink Data Rate	MIR - Uplink Burst Allocation	MIR - Downlink Burst Allocation	Uplink CIR – Default = 0	Downlink CIR Default = 0
4 Mb	4000 kbps	2000 kbps (Range 0-4000)	2000 kbps (Range 0-4000)	500000 kbits (Range 0-500000)	500000 kbits (Range 0-500000)	Range (0-4000 kbps)	Range (0-4000 kbps)
10 Mb	10000 kbps	5000 kbps (Range 0-10000)	5000 kbps (Range 0-10000)	500000 kbits (Range 0-500000)	500000 kbits (Range 0-500000)	Range (0-10000 kbps)	Range (0-10000 kbps)
20 Mb	20000 kbps	10000 kbps (Range 0-20000)	10000 kbps (Range 0-20000)	500000 kbits (Range 0-500000)	500000 kbits (Range 0-500000)	Range (0-20000 kbps)	Range (0-20000 kbps)
40 Mb	50000 kbps	25000 kbps (Range 0-50000)	25000 kbps (Range 0-50000)	500000 kbits (Range 0-500000)	500000 kbits (Range 0-500000)	Range (0-50000 kbps)	Range (0-50000 kbps)


Configuration → Quality of Service (QoS)
5.7GHz OFDM - Subscriber Module - 0a-00-3e-3f-fe-05
Save Changes
MIR Bandwidth Settings
(Uplink + Downlink) Sustained Data Rate <= 20000 kbps
Sustained Uplink Data Rate : 2000 (kbps) (Range: 0— 20000 kbps)
Sustained Downlink Data Rate : 2000 (kbps) (Range: 0— 20000 kbps)
Uplink Burst Allocation : 500000 (kbits) (Range: 0 — 500000 kbits)
Downlink Burst Allocation : 500000 (kbits) (Range: 0 — 500000 kbits)
Enable Broadcast/ Multicast Data Rate : Enabled Disabled
Broadcast/ Multicast Uplink Data Rate : 20000 (kbps) (Range: 1— 20000 kbps)
CIR Bandwidth Settings
Low Priority Uplink CIR : 0 (kbps) (Range: 0— 20000 kbps)
Low Priority Downlink CIR : 0 (kbps) (Range: 0— 20000 kbps)
Hi Priority Channel : Enabled Disabled

PMP 320 Overview

Typical Application	Fixed, outdoor, licensed connectivity, interoperable with 802.16e CPE
Example Deployment	Service provider building fixed outdoor coverage to complement a mobile WiMAX network
Spectrum	3.3, 3.5 and 3.6 (including 3.65) GHz licensed spectrum
Performance	LOS and nLOS performance
Aggregate Throughput	>45 Mbps per sector
Range	• > 20 Mbps at 10 miles
Latency	25 msec one way
Security	128/256 bit AES (FIPS 197 certified)

Mesh Access Networks



Mesh Network
Access Layer

Fixed or Mobile Access

Ad-hoc Self-forming and Self-healing

Highly Reliable and Scalable

Easy, Cost-effective Deployment

Mesh Wide Area Networks Value

Value Proposition

- Mesh Wide Area Network (MWAN) solutions enable mobile data, voice, and video that fulfill the needs of municipal, public safety and enterprise customers

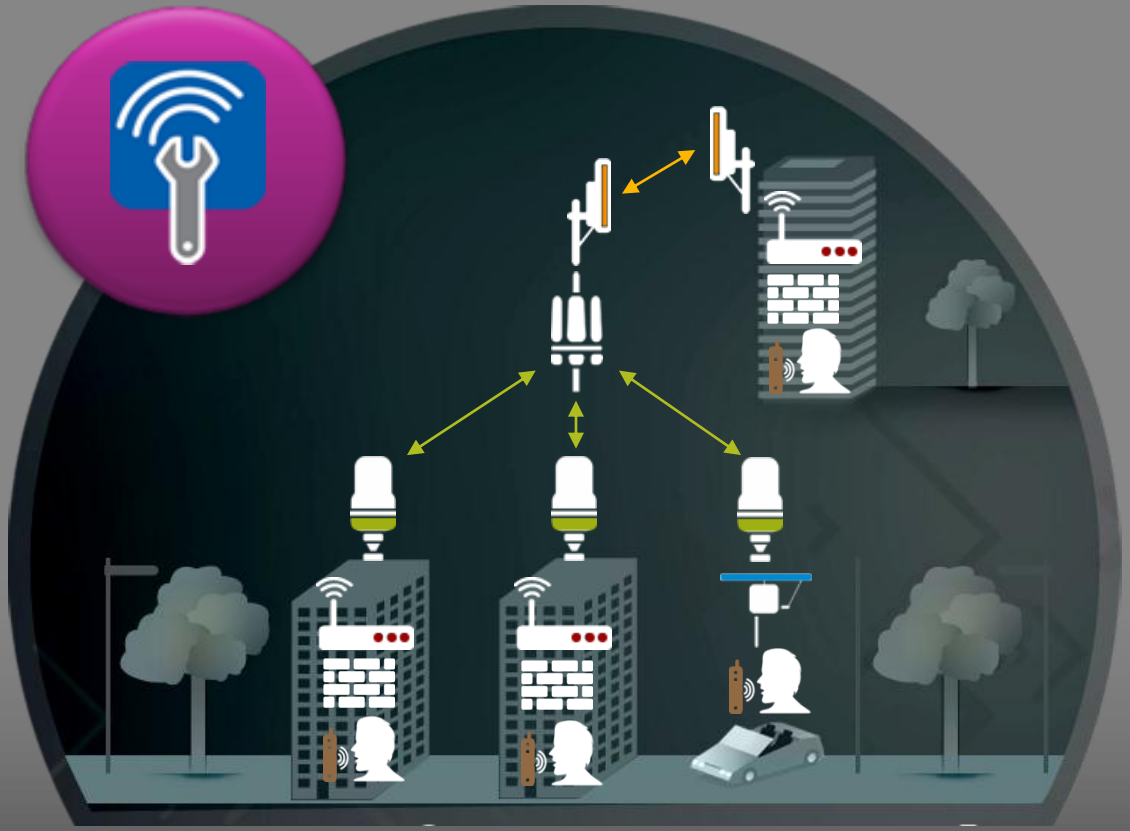
Key Features

- Maximum data rate of 300 Mbps
- Integrated antennas
- Indoor/outdoor seamless connectivity
- Standards based and proprietary solutions
  - 802.11b/g/a/n
  - MEA (Mobility Enabled Access)
- Self-healing, self-forming
- High speed mobility (200+ mph)
- MeshConnex™ routing technology

Portfolio Components

	4300 Series	6300 Series	7181 Series	7300 Series
Radio Frequencies	2.4, 4.9, 5.4 and 5.8 GHz	2.4 GHz 2nd ISM Band	2.4, 5.4, and 5.8 GHz	2.4 and 4.9 GHz
Channel Width	10 and 20 MHz	20 MHz	20 and 40 MHz	20 MHz
Mobility	Up to 80 mph	200+ mph	Up to 80 mph (compatible with VMM 4300)	200+ mph
Throughput (Burst Data Rate)	54 Mbps	6 Mbps	300 Mbps	6 Mbps (MEA), 54 Mbps (802.11b/g)
Client Encryption Support	For 802.11b/g: WEP, AES, TKIP, WPA and WPA2 (802.11i)	WEP, AES, WPA (TKIP) and WPA2 (802.11i)	WEP, AES-CCM, TKIP	For 802.11b/g: WEP, AES, TKIP, WPA2 (802.11i)
Intra-Mesh Encryption	Secure Mesh/AES	Secure Mesh/AES	Secure Mesh/AES	Secure Mesh/AES

One Point Wireless Suite



One Point Wireless Suite

Software that helps design, deploy, manage and secure the network.

Motorola One Point Wireless Suite

Design
Deploy

BroadbandPlanner | *Wireless Manager*

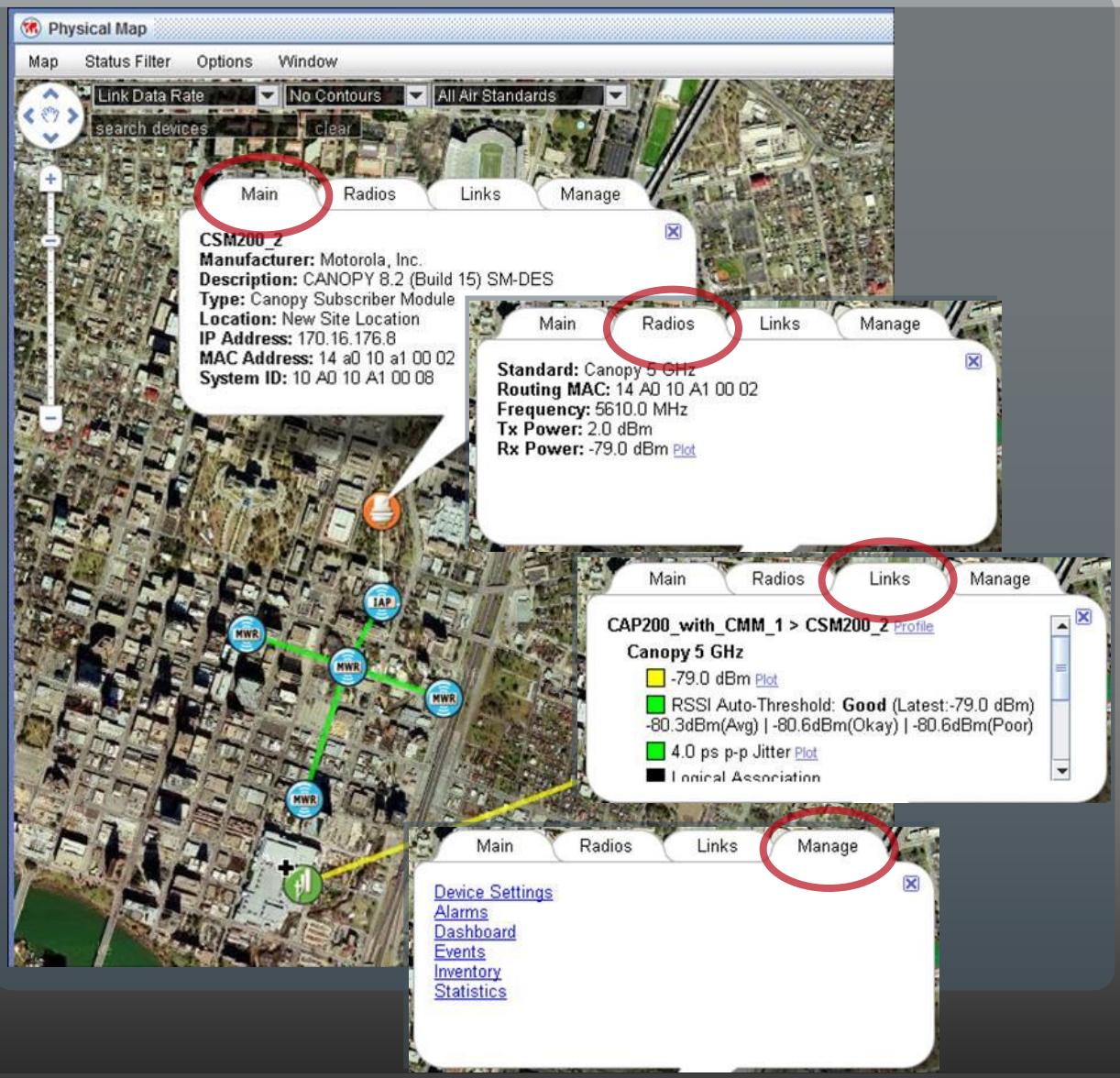
PTP LINKPlanner | *RFMS*

LANPlanner | *ADSP*

Manage
Secure

One Point Wireless Suite

WM 2.2 - Feature Highlights



Node Management

Main Info

Live Radio Parameters

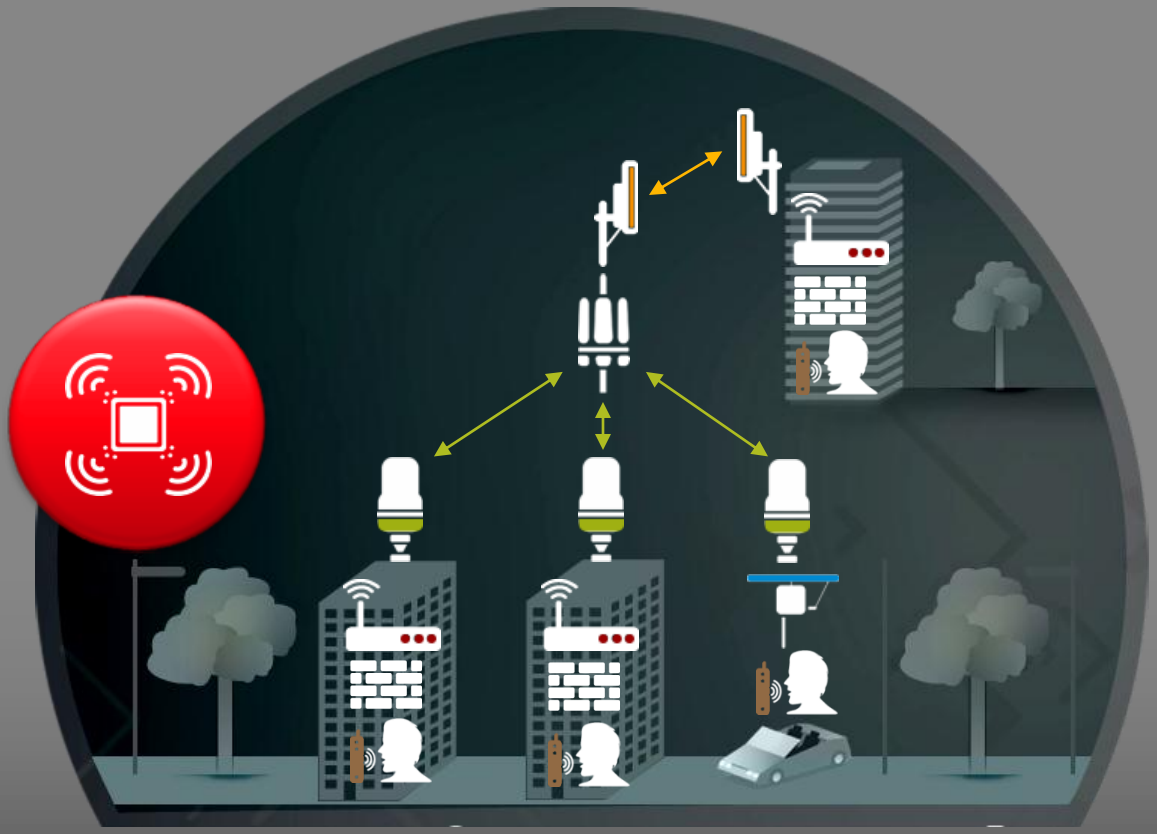
Live Link Performance

Manage Functions

At Your Fingertips

Access information and common tasks right from the element icon on the map.

WLAN



Indoor WLAN
Access Layer

Use as Primary Network

802.11a/b/g/n Meshing Access Points
- **n for Backhaul**
- **a for Voice**
- **b/g for Legacy Data**
- **n for New Notebooks**
- **a/b/g/n Integrated Sensor**

Lower Total Cost of Ownership

Reliable, Secure, Easy to use

WLAN Value

Value Proposition

→ Wireless network access for mobile users that provides unmatched reliability, gap-free security and the best ROI and lowest TCO

Key Features

→ Complete indoor/outdoor 802.11abgn portfolio
⊙ SMB to world's largest wireless LAN
→ Multi-purpose Access Points
→ Next generation adaptive architecture
→ Fast and simple deployment
→ Self optimizing & healing
→ Reliable and survivable
→ Most power & performance per Access Point
→ Integrated AirDefense security & network assurance technologies
→ Integrated, gap-free security

Enterprise Wireless LAN Portfolio

WIRELESS SWITCHES

Headquarters

RFS 7000
Supports 1,024 – 12,000 AP's

Medium-Large Enterprise

RFS6000
Supports 256 – 3072 AP's
3G WAN Backhaul
Expansion Slot for New Applications

SMB/Branch Office

WS2000 : RFS4000
Supports 1-6 AP's
Network-in-a-box

ACCESS POINTS

Lightweight AP

AP300 (Dual-radio a/b/g)

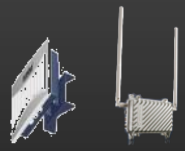
AP650 (Three-radio a/b/g/n)

Adaptive AP

AP-7131 (Tri-radio a/b/g/n)
AP-5131 (Dual-radio a/b/g)

Remote Site Survivability

Resilient, Self Forming Mesh



Outdoor AP

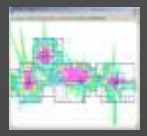
AP-5181 (Dual-radio a/b/g)

Supports mesh, Class 1 Div 2 Certified

Motomesh DUO (Dual-radio a/b/g)

MANAGEMENT

RF MANAGEMENT SUITE
(End to End RF Management)
ADSP
(Airdefense Service Provisioning)



LAN Planner ; Broadband Planner

Network Design, Site Survey

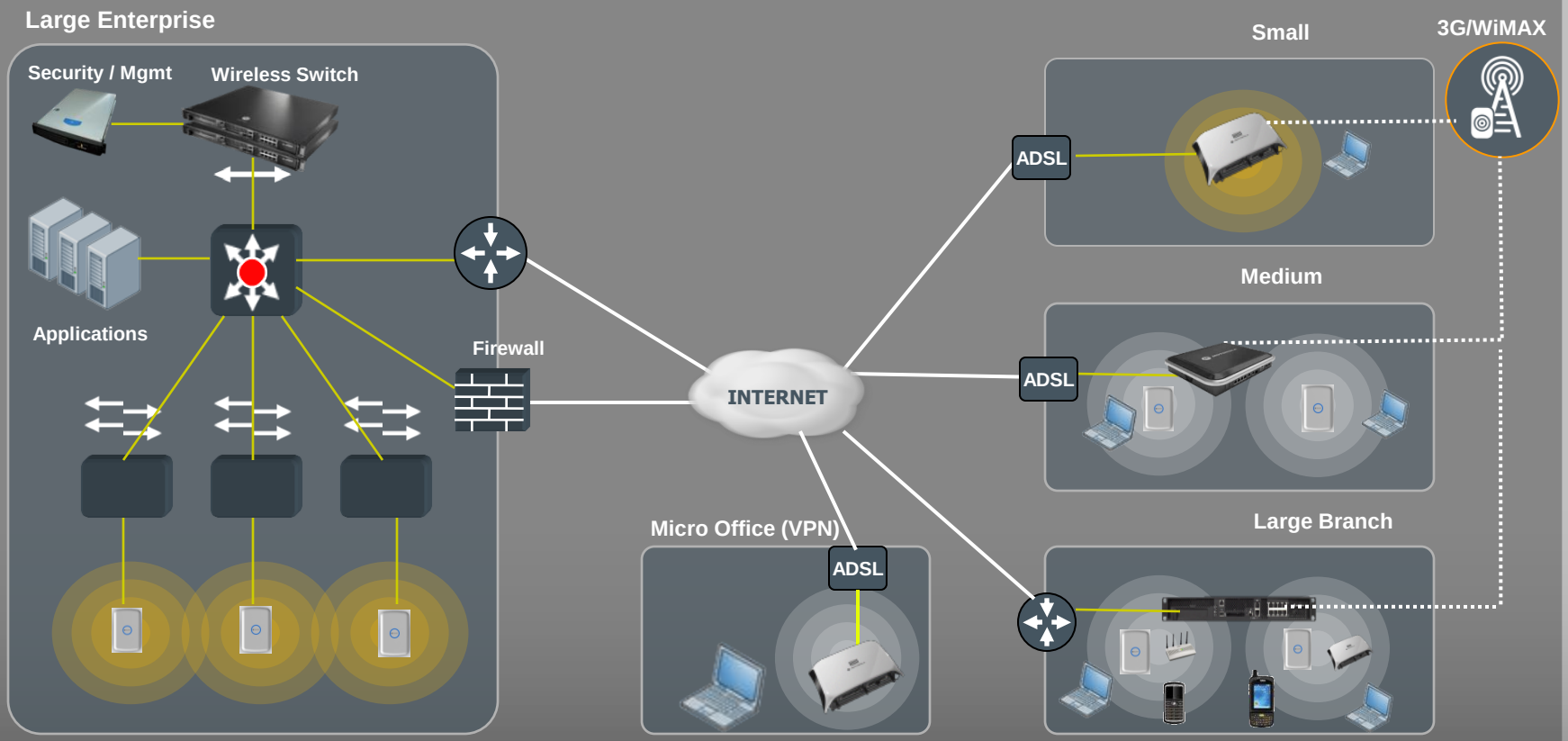
Configuration Management

Monitoring
Troubleshooting

Real Time Location System

Track Assets Using Wi-Fi, RFID Technology

Motorola's Versatile EWLAN Portfolio



Large Enterprise deployment

Distributed enterprise local switch / Adaptive deployment

Wireless WAN backhaul for WAN failover & Load balancing

Motorola Solutions for the Distributed Enterprise

- Enables a variety of branch deployment scenarios
- Provides Unmatched Reliability, Security, TCO
- Extremely easy to Deploy & Manage

Motorola Wireless Switches

Common Software "Wi-NG"

Performance

WS2000

SME / SMB – 802.11 a/b/g

6 x APs / Switch

200 Users

New

RFS4000

SME / SMB – 802.11 a/b/g/n

6 x APs / Switch
72 X APs/ Cluster

500-5,000 Users

RFS60(

BEST OF INTEROP FINALIST 2008 Presented by InformationWeek

Mid / Large Enterprises

256 x AAPs / Switch
3,072 x AAPs / Cluster

Expansion slots for 3G/4G Wireless Backhaul & Voice

2,000 – 20,000 Users

RFS70(

GCN BEST OF FOSE 2008 WINNER

Large Enterprises / Campus / NOC

1,024 x AAPs / Switch
12,288 x AAPs / Cluster

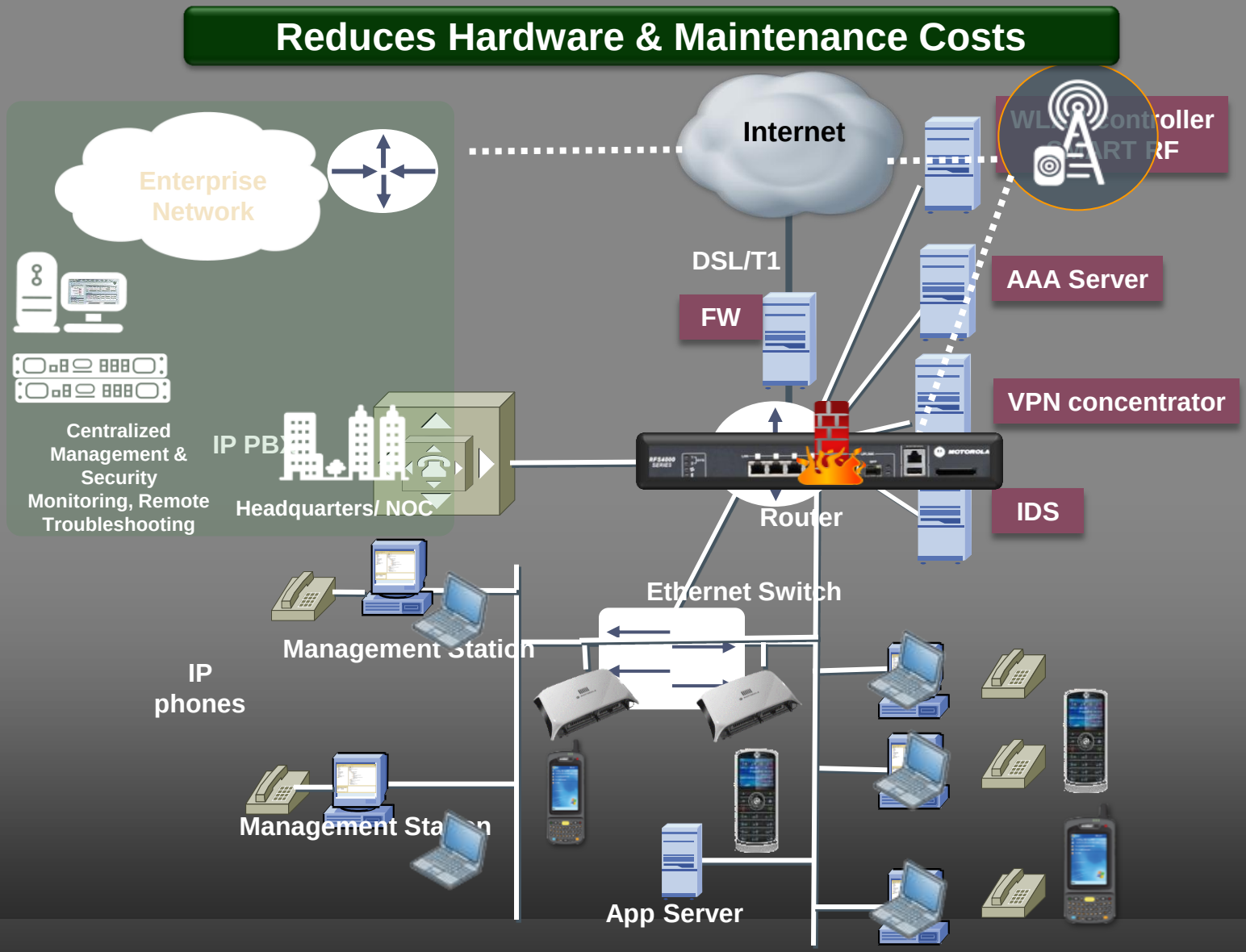
8,000 – 96,000 Users

Scalability

Wireless Switch Family

Feature	WS2000	RFS4000	RFS6000	RFS7000
Hardware Interfaces				
GiGE ports	6 10/100 ports	5X Gig E LAN ports 1 X Gig E WAN Port	8 X Gig E LAN ports 1X Gig E WAN Uplink	4 X Gig E
CF cards	•			•
USB		•	•	•
PoE/PoE+	4 X PoE ports	5 X PoE+ ports	8 X PoE+ ports	
Software Features				
AP 300 adoption Adaptive AP adoption	6 No Adaptive AP	6	48 256	256 1024
802.11n Support	802.11 a/b/g only	•	•	•
PPPoE; Wired IPS	•	Q2 2010	Q2 2010	Q2 2010
Networking : DHCP, AAA, IPSEC VPN, NAT	•	•	•	•
Mesh/Wireless Bridging	•	•	•	•
Clustering	Active: Standby	•	•	•
Wired/Wireless Firewall	L3 Stateful Firewall only	•	•	•

Integrated Networking Services



AP-7131 Product Configurations

Single & Dual Radio AP-7131

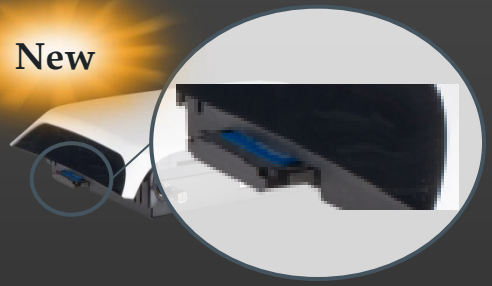
- Dual band a/b/g/n radios
- 3 x 3: 2 MIMO Performance
- Continuous full-band WIPS sensing

New

Tri Radio AP-7131

- Dual band a/b/g/n radios
- 3 x 3: 2 MIMO Performance
- Integrated WIPS sensor
- High Tx power of 27.7 dBm across 3 chains

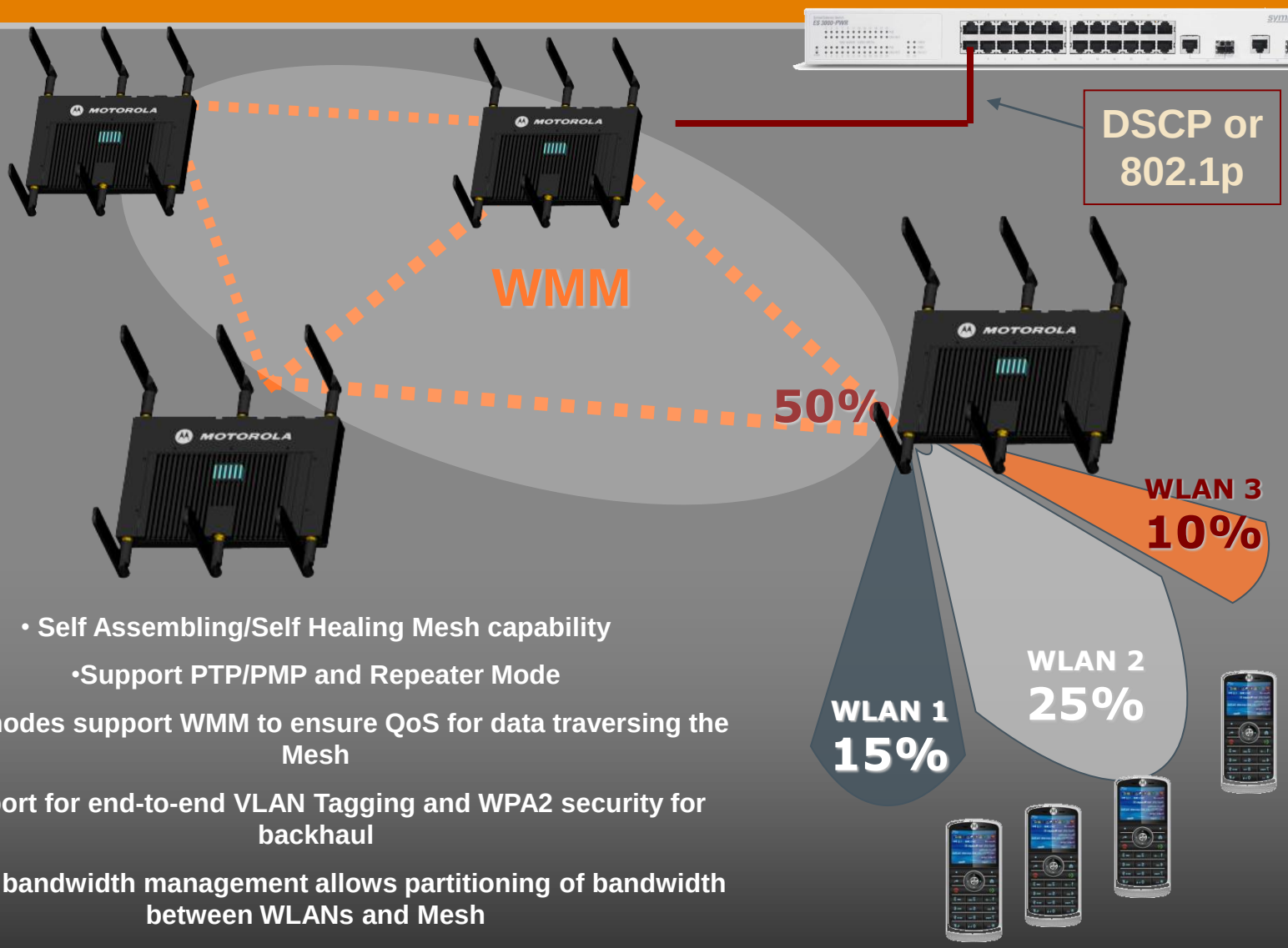
New



Dual Radio w/ ExpressCard Slot AP-7131

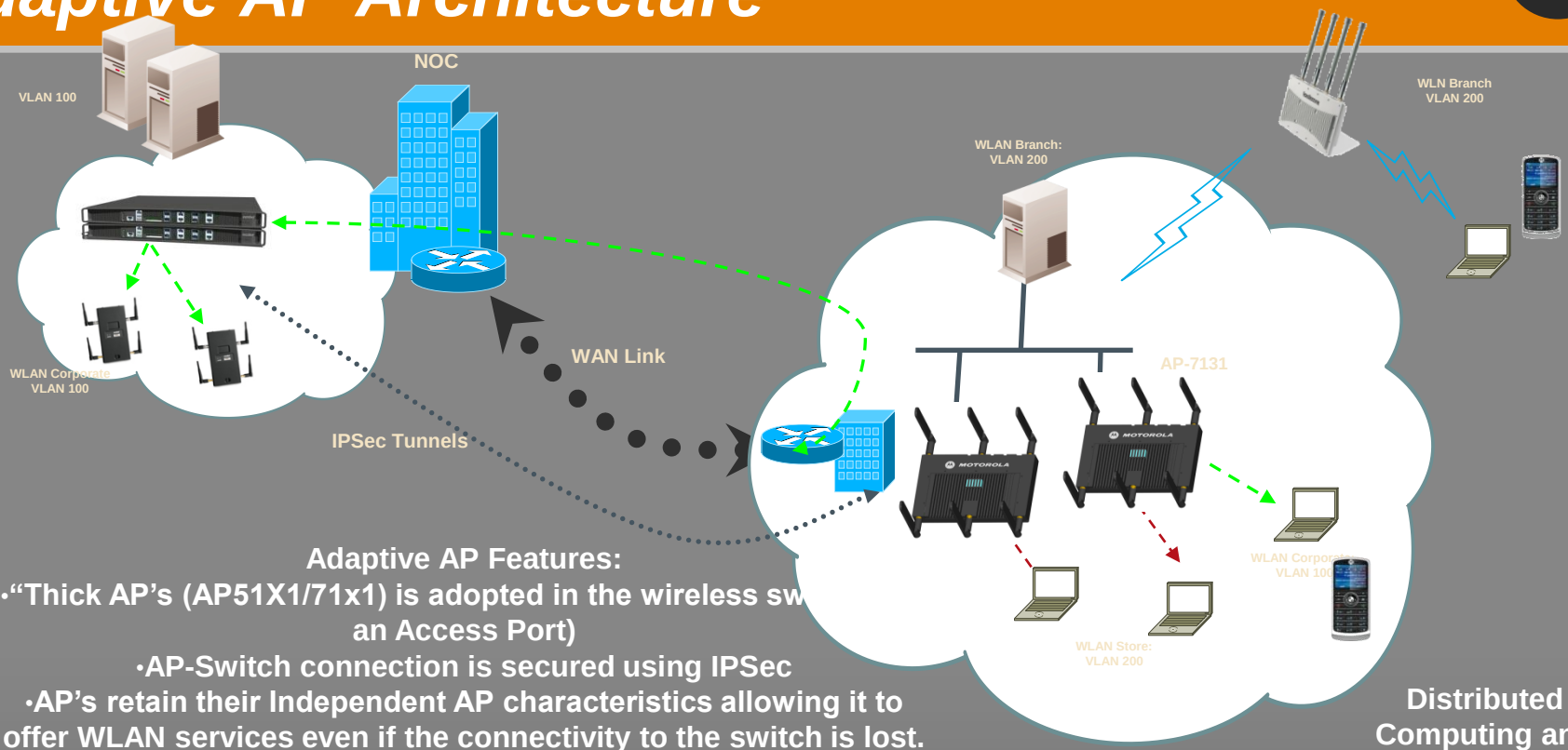
- Dual band a/b/g/n radios
- 3 x 3: 2 MIMO Performance
- ExpressCard Slot to support off-the-shelf 3G WAN
- High Tx power of 27.7 dBm across 3 chains

Mesh Support on 802.11n AP



- Self Assembling/Self Healing Mesh capability
- Support PTP/PMP and Repeater Mode
- Mesh nodes support WMM to ensure QoS for data traversing the Mesh
- Support for end-to-end VLAN Tagging and WPA2 security for backhaul
- WLAN bandwidth management allows partitioning of bandwidth between WLANs and Mesh

Site Survivability with Adaptive AP Architecture



Adaptive AP Features:

- "Thick AP's (AP51X1/71x1) is adopted in the wireless sw… an Access Port)
- AP-Switch connection is secured using IPSec
- AP's retain their Independent AP characteristics allowing it to offer WLAN services even if the connectivity to the switch is lost.
- AP51X1/71X1 can switch local traffic within the AP

Benefits:

- Centralized configuration and management from the Wireless Switch.
- Site Survivability:
- WLAN services at a remote site will be unaffected in case of a WAN outage.
- Securely Extend Corporate WLAN's to Stores
- Maintain Local WLAN's for in store applications.

Distributed Computing and Security Enforcement at the Edge

Adaptive (Distributed)

Introducing AP-650: Cost effective entry into 802.11n

Plug and Play Install without a forklift Upgrade

Zero touch installation – true Plug & Play. Application and Session persistence without complex configurations. Fully powered by 802.3af provides investment protection for existing PoE infrastructure

Centralized Management for large scale deployments

One point of configuration, multiple points of control for Layer 2 and Layer 3 Deployment and Mobility

Security without compromise

24*7 sensor for Security while providing bandwidth for multi-media intensive applications

DFS2 Compliance with Affordable migration

Plenum rated to support above-ceiling deployment, this AP is DFS2 compliant without a premium for 802.11n

AP650: Dependent Access Point

New

802.11n performance without the premium price

- Full performance on 802.3af power
- 2x3 MIMO for improved RF performance
- Rated for operation from 0 – 50 degrees C
- Fully DFS2 compliant for full use of 5GHz channels

Versions to meet all installation needs

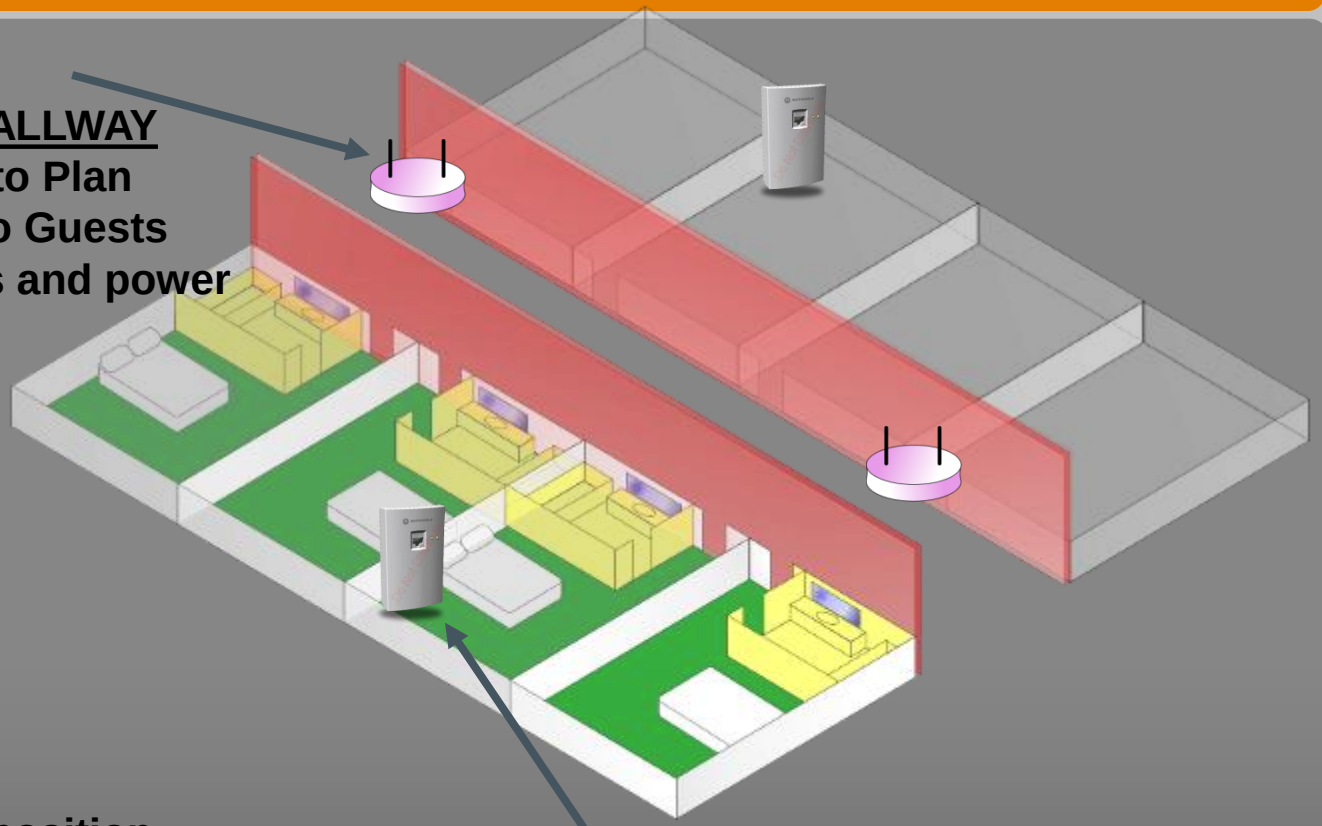
- Dual or Single radio SKUs available
- Metal Plenum rated version with external antennas
- Attractive non-plenum plastic enclosure with integrated antennas

Introducing

AP 6511 Wallplate Access Point

Traditional APs are not designed for Hotels

AP INSTALLED IN HALLWAY
Takes a lot of time to Plan
Install is disruptive to Guests
Expensive to pull cables and power



Value Proposition:

Install APs in the guest room for better WLAN, faster install, and higher guest satisfaction

AP INSTALLED IN GUEST ROOM
Minimal site survey time
Rapid installation – minutes not hours
Use existing Cat5/6 wire in the walls

AP 6511 WallPlate AP

Radio and Performance
- 802.11 a/b/g/n, 2x2 MIMO, dual 3.5dBi antennas
- 26dBm max EIRP with two chains

Management
- Controller AP - one AP will manage up to 25
- Standalone - webUI, CLI
- RF Controller - Layer 2/3 adoption by RFS 4k, 6k, 7k

Form Factor
- Low profile, sleek design
- One minute install over telecom wall plate
- Mount on telco plate, wall, ceiling

Interfaces
- 1 x snap-in port for keystone style connector
- 3 x 10/100Mb snap-on module
- 1 x 10/100Mb uplink LAN, 802.3af PD
- 1 x 802.11a/b/g/n radio

About the size of a deck of cards

7.5cm x 12.5cm x 2.5cm
3” x 5” x 1”

Snap-On Ethernet Module

Module Description

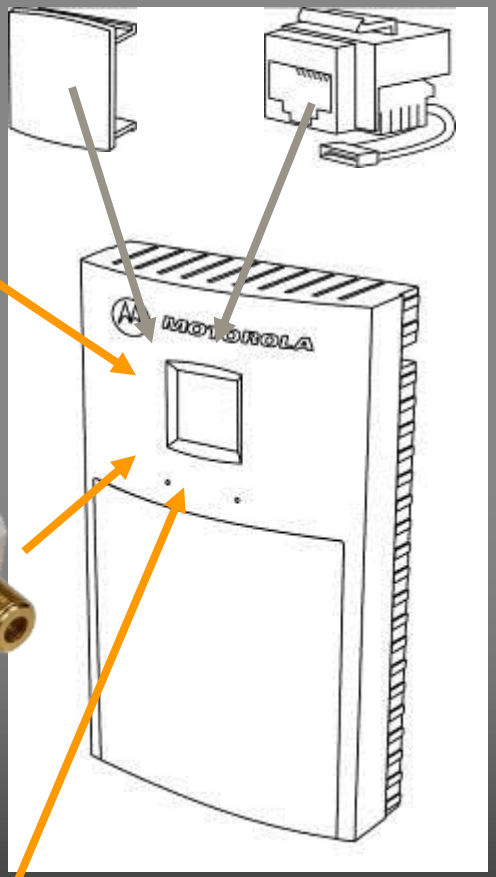
- Field installable, snap-on
- 3 x 10/100Mb switched Ethernet ports
  - Per port 802.1Q, QoS, 802.1x

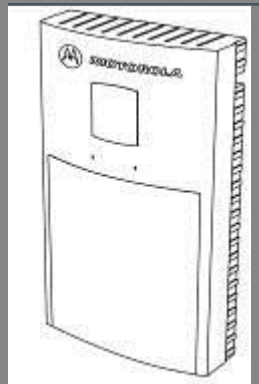
Hidden connector

Remove access cover

Snap on Module

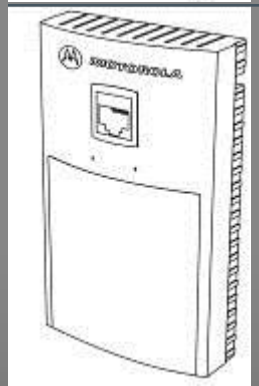
Modular Design





AP with no external ports

(use included Blank)



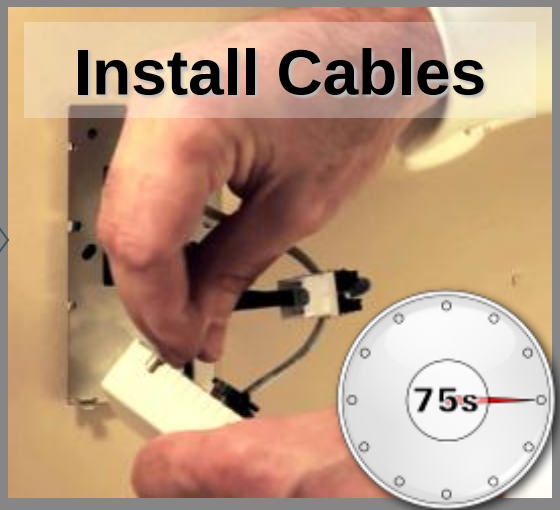
AP with one connector

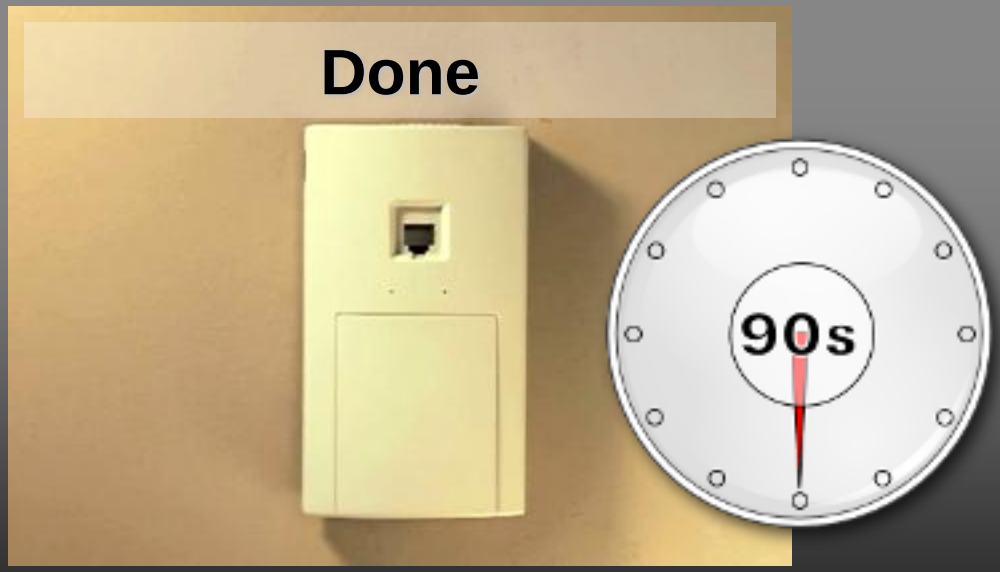
(add any <u>one</u> of the connectors shown at left)

AP with Ethernet Module

(add any <u>one</u> of the connectors shown at left)

AP 6511 Installation





Hotel Solution Architectures

Full Service Hotel

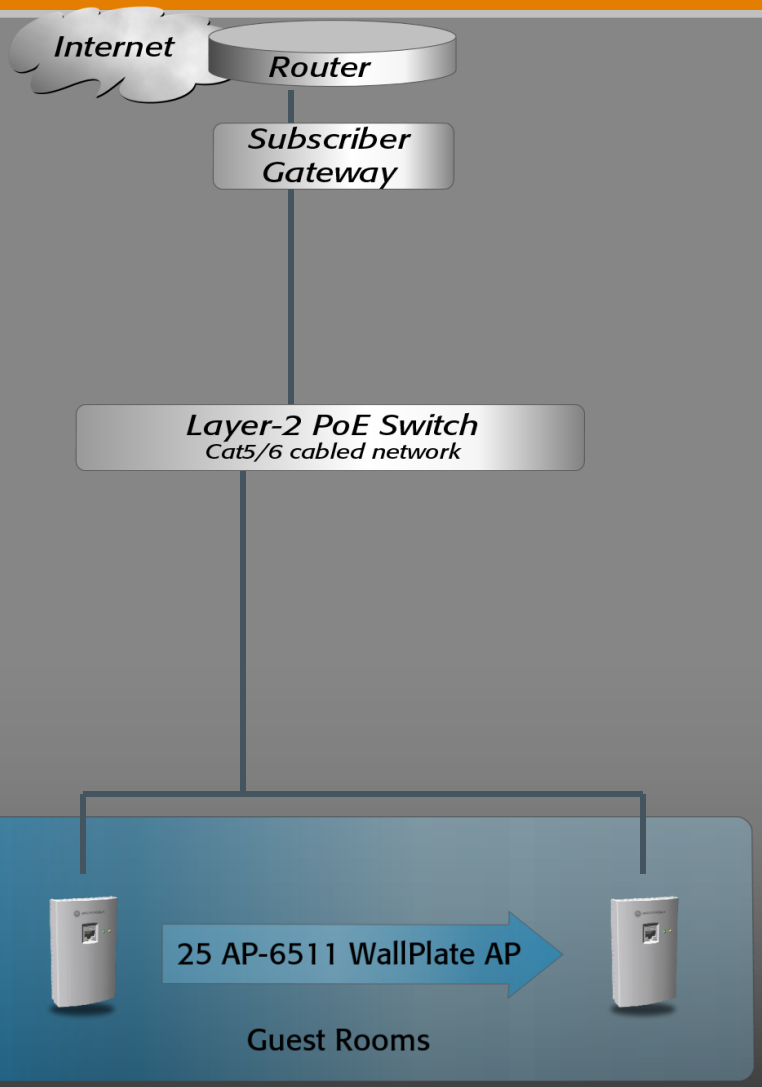
Select Service Hotel

Limited Service Hotel – *40%*

<100 rms to ~125 rms

Lobby

Guest Rooms



Hotel Solution Architectures

Full Service Hotel

Select Service Hotel – *34%*

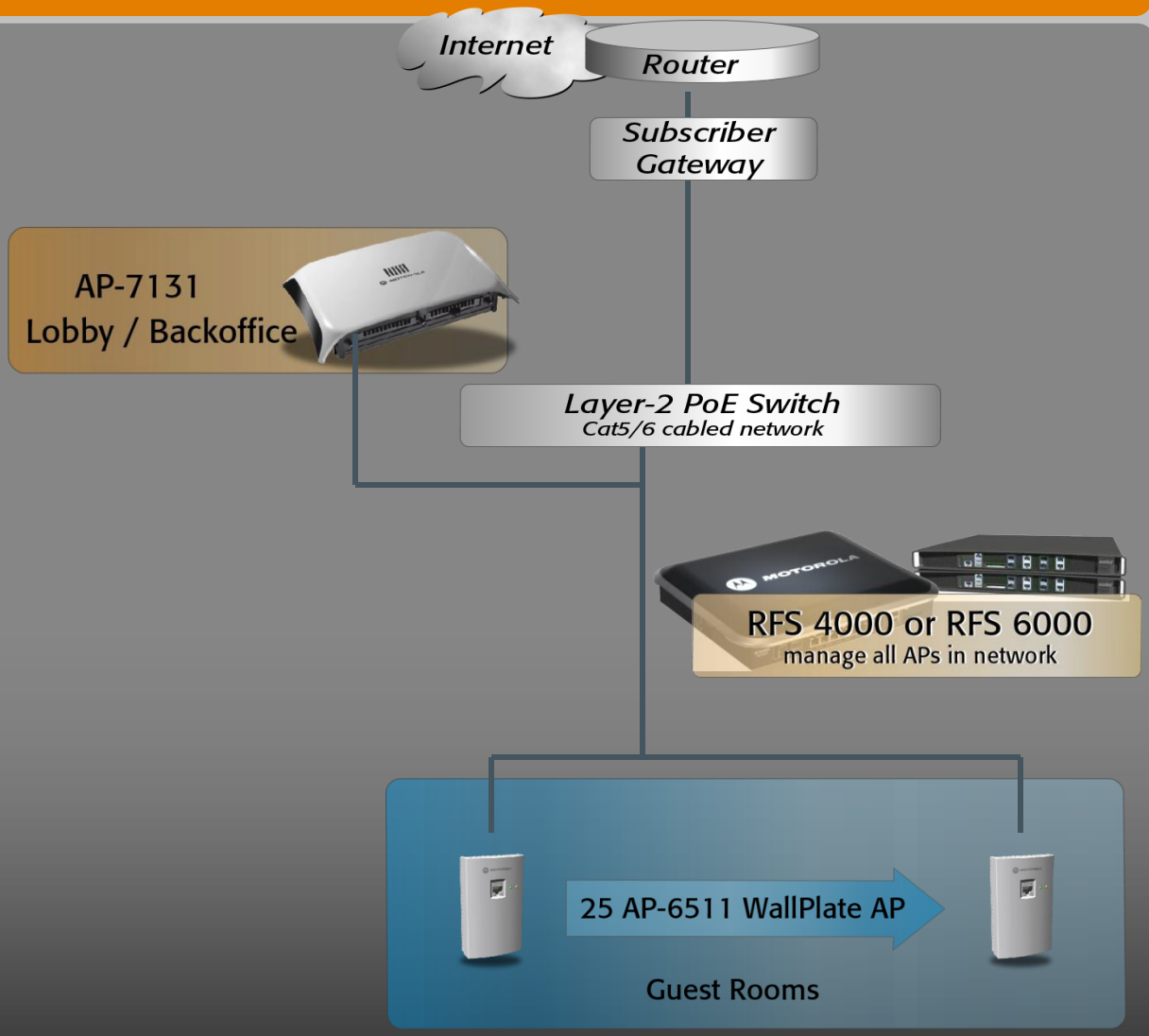
~125 rms to ~300 rms

Meeting Rooms
Lobby/Backoffice
Guest Rooms

Limited Service Hotel – 40%

<100 rms to ~125 rms

Lobby
Guest Rooms



Hotel Solution Architectures

Full Service Hotel *– 26%*

~300 rms to ~2000 rms

Outdoor Facilities
Conference Facilities
Lobby/Backoffice
Guest Rooms

Select Service Hotel – 34%

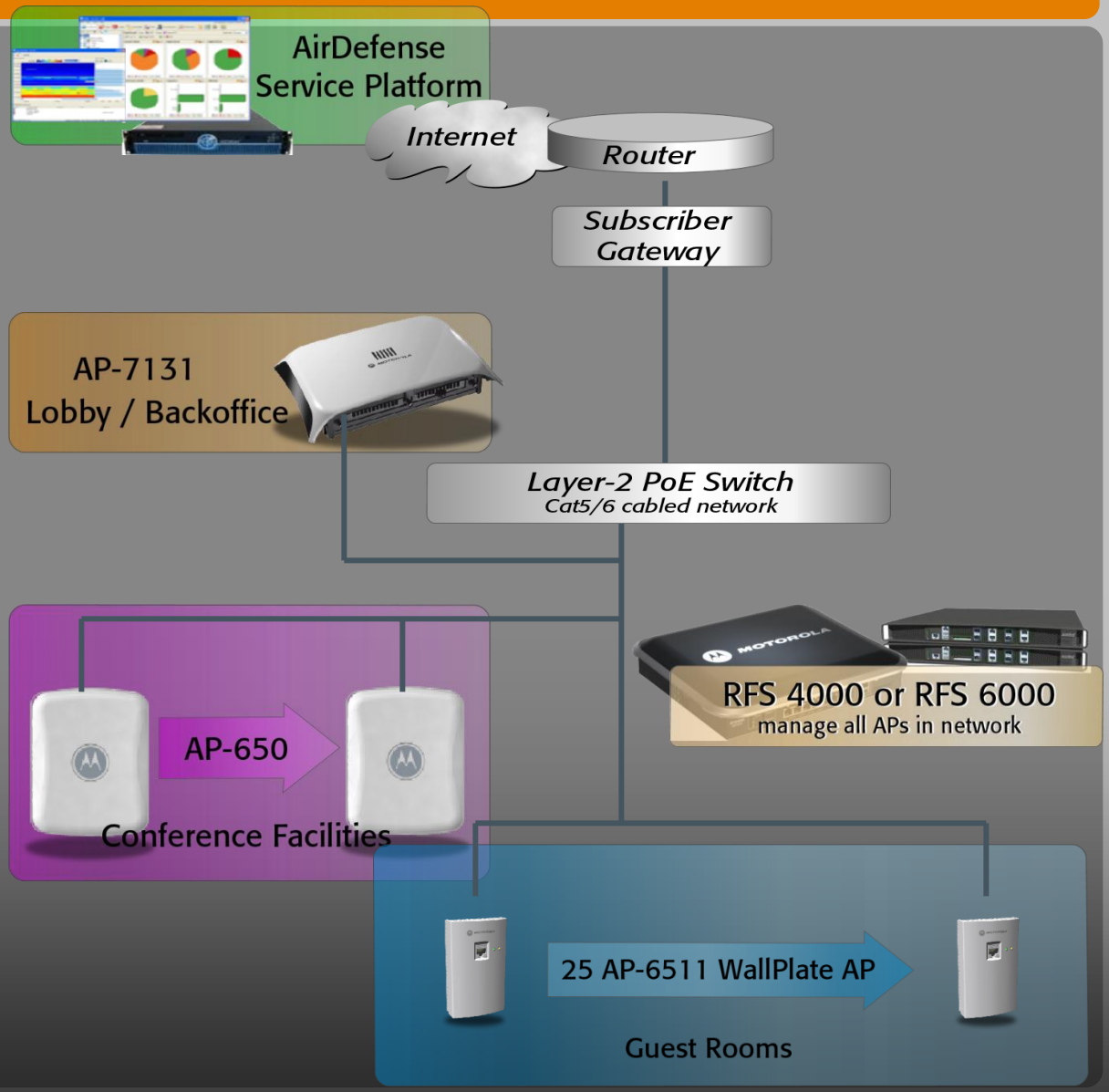
~125 rms to ~300 rms

Lobby/Backoffice
Guest Rooms

Limited Service Hotel – 40%

<100 rms to ~125 rms

Lobby
Guest Rooms



AP 6511: 802.11n WallPlate AP – purposely designed for MDUs

Controller AP

– Management scales from One to Thousands

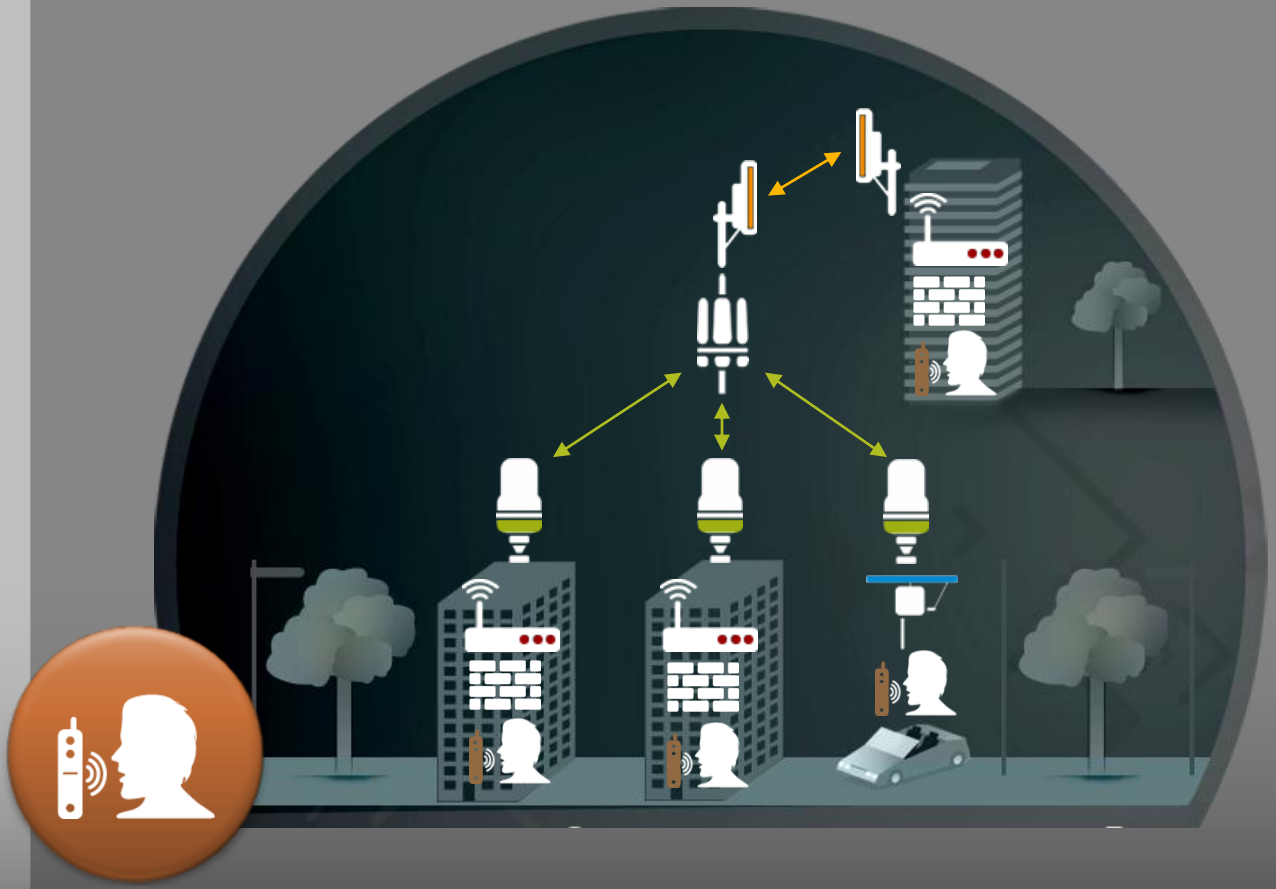
Rapid Installation

– Snap-On Installation, modular design

Advanced Design

– Sleek, compact, "hide-in-sight"

Voice over WLAN (VoWLAN)



VoWLAN
Access Layer

Turn the desktop into a pocketable virtual office. Mobile access over the WLAN to the voice and data services needed to increase productivity, collaboration and customer satisfaction.

Total Enterprise Access Mobility (TEAM) Value

Value Proposition

Improves customer service and worker productivity

→ Mobile access to the people and information workers need at the point of work

Key Features

→ Interoperability – TEAM VoWLAN, TEAM Express, Motorola MCs, TEAM Badge, and 2-Way Radios (via TEAM RLS)

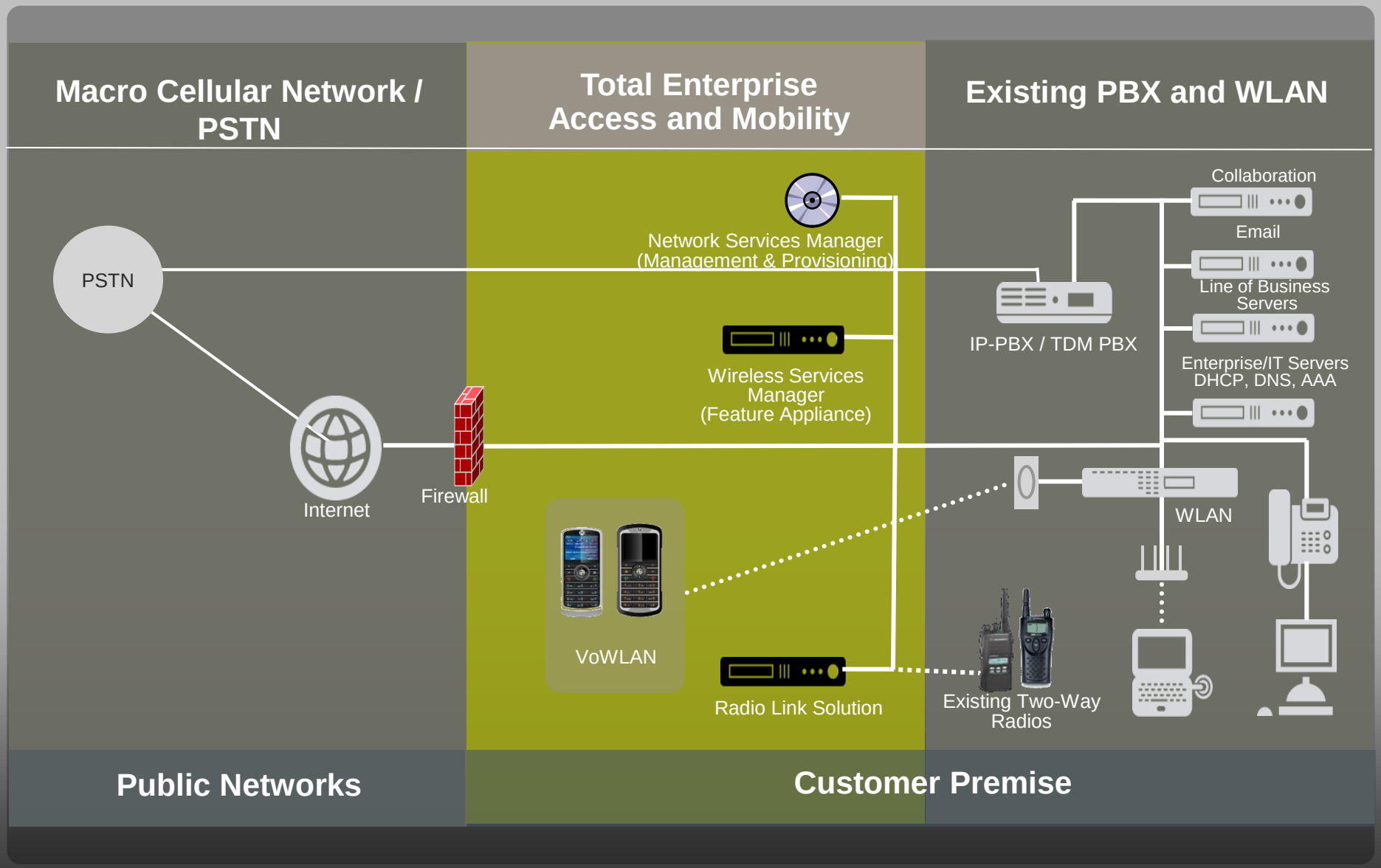
→ Reduce Capital & Operational Expenditures – no need for multiple devices; leverage existing infrastructure; reduce IT management time

→ Flexible and Scalable – works with a broad range of PBXs, scales from a handful to thousands of users

→ TEAM VoWLAN Services Include

- **⊙ Toll Quality PBX Voice**
- **⊙ Enterprise-Grade PTT**
- **⊙ Email, Calendar, PIM, SMS**
- **⊙ Line of Business Applications**

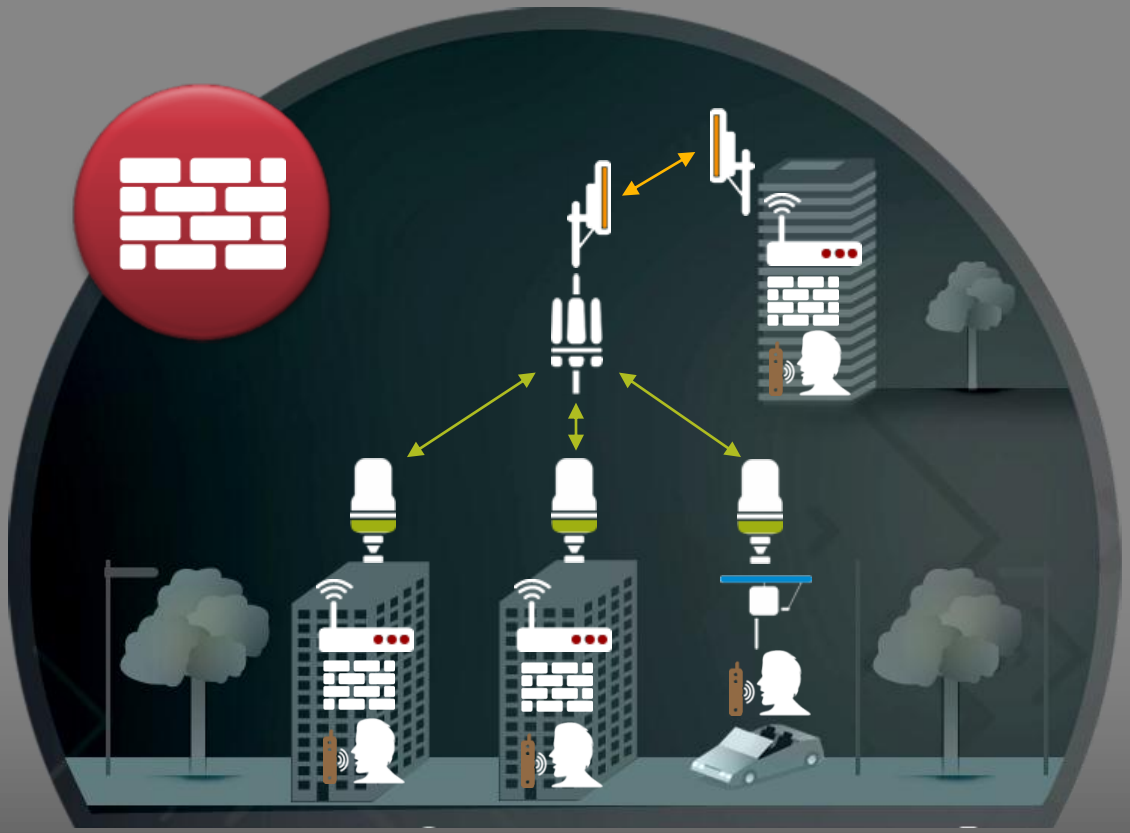
TEAM VoWLAN Solution



TEAM Portfolio

	TEAM VoWLAN	TEAM Express	TEAM RLS	TEAM Badge
Description	Comprehensive mobile access over WLAN for voice and data services	Push-to-talk communications among multiple, disparate devices, including Motorola voice-capable mobile computers and TEAM devices	Interoperability with basic PTT talk-group communications between two-way radio systems and TEAM VoWLAN and TEAM Express devices	Affordability and portability to mobile voice, providing basic Push-to-Talk (PTT) communications
Components	• EWP1000 • EWP2000 • Wireless Services Manager (WSM) appliance • Network Services Manager (NSM)	Downloadable software voice client that can be added to a wide range of Motorola mobile computers pre-loaded on the TEAM VoWLAN smartphones and TEAM badge.	• RLS appliance • Radio Interface Unit (RIU) • 2-way radio donor devices	• TEAM badge (EWB 100)

AirDefense



AirDefense Security

The most powerful vendor-agnostic Wireless Intrusion Prevention System (IPS) available

AirDefense Solutions Value

Value Proposition

→ Ensure network security with the most powerful vendor-agnostic wireless monitoring system on the market.

→ *The Network Assurance Suite improves wireless availability and reduces downtime.*

→ *Manage WLAN infrastructure across multiple device types and multiple vendors.*

Key Features

→ SECURITY & COMPLIANCE

Prevent data breaches which cost $200-$300 per record by spending only 5% the data breach cost up-front.

Generates automatic wireless compliance reports with forensics.

→ NETWORK ASSURANCE

Wireless troubleshooting can cost over $1000 per visit. Use remote troubleshooting tools to reduce operational costs.

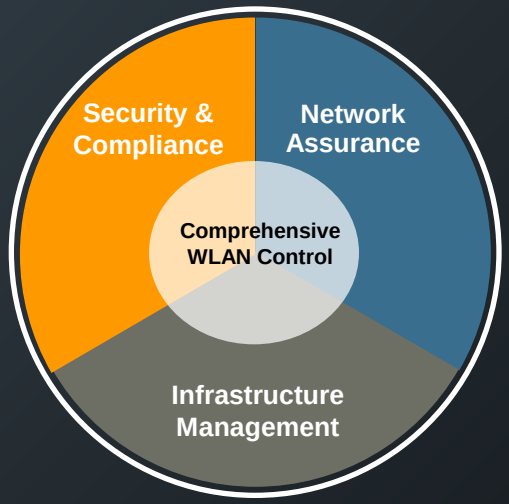
Resolves over 70% of wireless trouble tickets remotely.

→ NETWORK MANAGEMENT (March 2010)

One central management console, offering a more holistic approach to network management.

A cost effective way to upgrade/migrate to 11n infrastructure by allowing central management of legacy infrastructure.

How to Think about the AirDefense Services Platform



SECURITY & COMPLIANCE

- Rogue Elimination
- Intrusion Detection
- Automated Defenses
- Forensic Analysis
- Legacy Protection
- Mobile Protection
- Wireless Vulnerability Assessment

INFRASTRUCTURE MANAGEMENT

- Vendor Neutral WLAN Management
- Centralized Configuration
- Policy-based Fault Mgmt
- Automated Discovery
- Network Visualizations
- Firmware Management

NETWORK ASSURANCE

- Solve Issues Remotely
- Level 1 Helpdesk
- Proactive Monitoring
- Spectrum Analysis
- Coverage Visualizations
- Remote Packet Capture
- Historical Analysis

PBN – Private Broadband Network
T3 and Wallplates

Key Value Proposition

Enable COST-EFFECTIVE broadband infrastructure

- Use existing phone wire already in place
- No need to re-wire the building
- Quick and reliable installation
- Single and secure power source
- Eliminate power and in-room disconnects

Components in the Solution

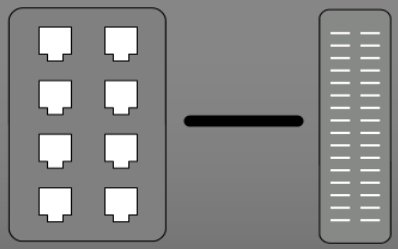
T3 PowerBroadband Switch

Purposefully designed for hospitality

- 2 x GigE uplink ports, 25 x UTP downlink ports, 1RU high
- Integrated POTS filter
- Up to 75Mbps to each connected WallPlate
- Network managed; telnet, webUI, SNMPv2c

AC power

600m (2kft) telephone wire



PBX

Phone block

POTS + Power + Broadband

300m (1kft) telephone wire

M2 WallPlate

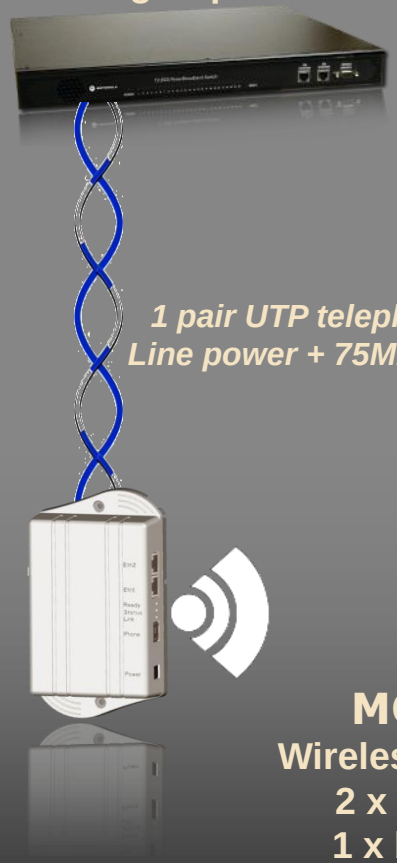
- *2 x FE ports*

MC-802 WallPlate

- *2 x FE ports*
- *1 x 11b/g radio*

Technical Specifications

T3
25-port PowerBroadband Switch
2 x GigE uplink



1 pair UTP telephone wire
Line power + 75Mbp at 300m

MC-802
Wireless WallPlate
2 x FE ports
1 x b/g radio

802.11b/g Wireless WallPlate

- ***Central Configuration, Status, Statistics from T3 Switch***

- ***Per Ethernet Port:***
  - *802.1Q VLANs, QoS*
  - *802.1Q tagged/untagged per Port*
  - *Configuration and status*

- ***Per Radio:***
  - *802.11 b/g*
  - *16 BSSID*
  - *Tx power in 1db increments (1 to max)*
  - *Tx power adjustment per packet*
  - *Auto/manual datarate from 1 to 54*
  - *1 to 20dBm, 3.1dBi diversity antennas*

- ***Per WLAN:***
  - *SSID, 802.1Q VLAN, WMM*
  - *WEP/WPA/WPA2, AES/TKIP*
  - *802.1x/EAP (TLS, PEAP, TTLS)*
  - *Client Isolation, DTIM, B-cast*

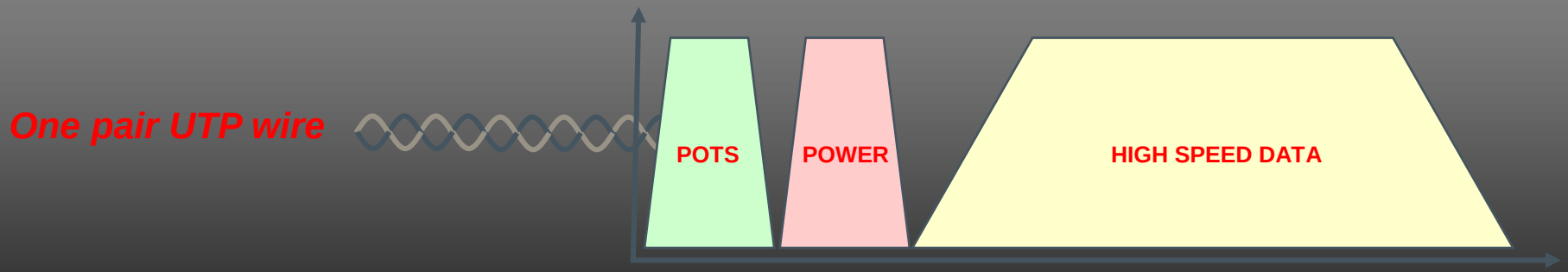
VDSL and Power Performance Specs

High Speed Data Targets

– 1000ft (300m)	75Mbps	Adaptive In-Line Power
– 2000ft (600m)	60Mbps	Line Power for m2 only
– 3000ft (900m)	20Mbps	with Local power supply
– 5000ft (1500m)	~1.5Mbps	with Local power supply

Adaptive In-Line Power - Patented

- Operates on single pair with analog POTS and High Speed Data
- Transparent to analog signals → phones always work
- Install on any telephone jack with bridged taps
- 600m (2kft) : 25 WallPlates, 2 x 100Mb ports each
- 300m (1kft) : 25 Wireless WallPlates, **2 x 100Mb ports**



Cable Types – UTP and non-UTP

T3 operates over UTP wire, sub-Cat3 to Cat5+

- ***The differences between categories of UTP wire relate to the amount of electromagnetic interference (EMI) they allow on wire pairs. Higher category wire has more twists, thus greater rejection of EMI.***

Non-UTP wire

- ***Has no common mode rejection of EMI – therefore it degrades xDSL***
- ***Can be fine if only found toward the end of the wire segment***
- ***Bad if found all the way from the MDF to each end-point***

Key: To dramatically improve performance with sub-cat3 wire, use only twisted pair cross-connect wire, amphenol cables, pre-wired blocks

Flat wire

QUAD wire

Part Numbers and descriptions

45225: 25 port T3 Switch

LINE – connect to PBX side

PHONE – connect to House side

45101: m2 WallPlate

Local power port

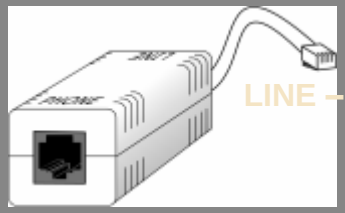
POTS Phone port

RJ45 Ethernet, Eth 1

RJ45 Ethernet, Eth 2

65601/65603: RJ11 In-Line Filter

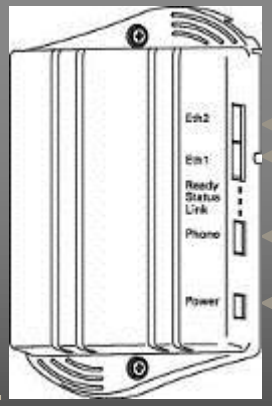
Note: filter must be installed as labeled



LINE – connect to wall jack RJ11 plug

PHONE – connect to analog phone

45010: Wireless WallPlate WallPlate



RJ45 Ethernet, Eth 2

RJ45 Ethernet, Eth 1

POTS Phone port

Local power port

65602: In-Line Filter (spider filter)

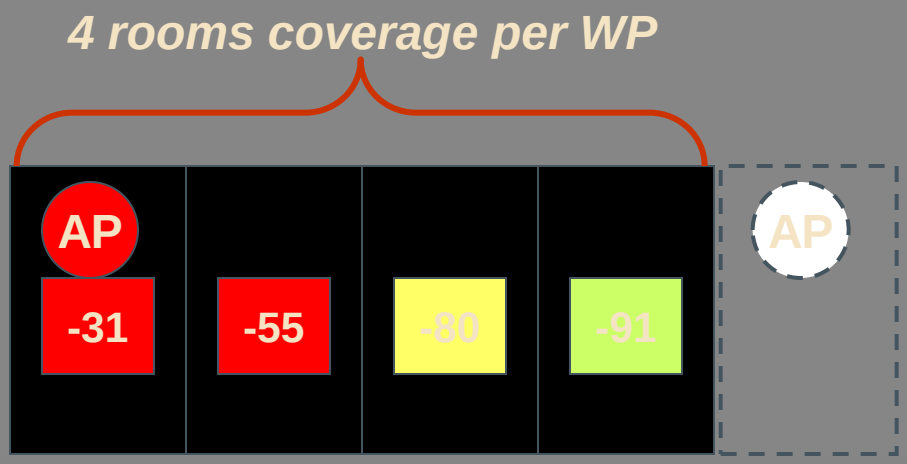
Note: filter must be installed as labeled

PHONE – connect to wires from the phone using wire bean connectors. Black wires

(not labeled) connect to wires from the PBX using wire bean connectors. Red wires

Site Survey – Wireless Coverage

Goal: Determine location of -90dBm signal



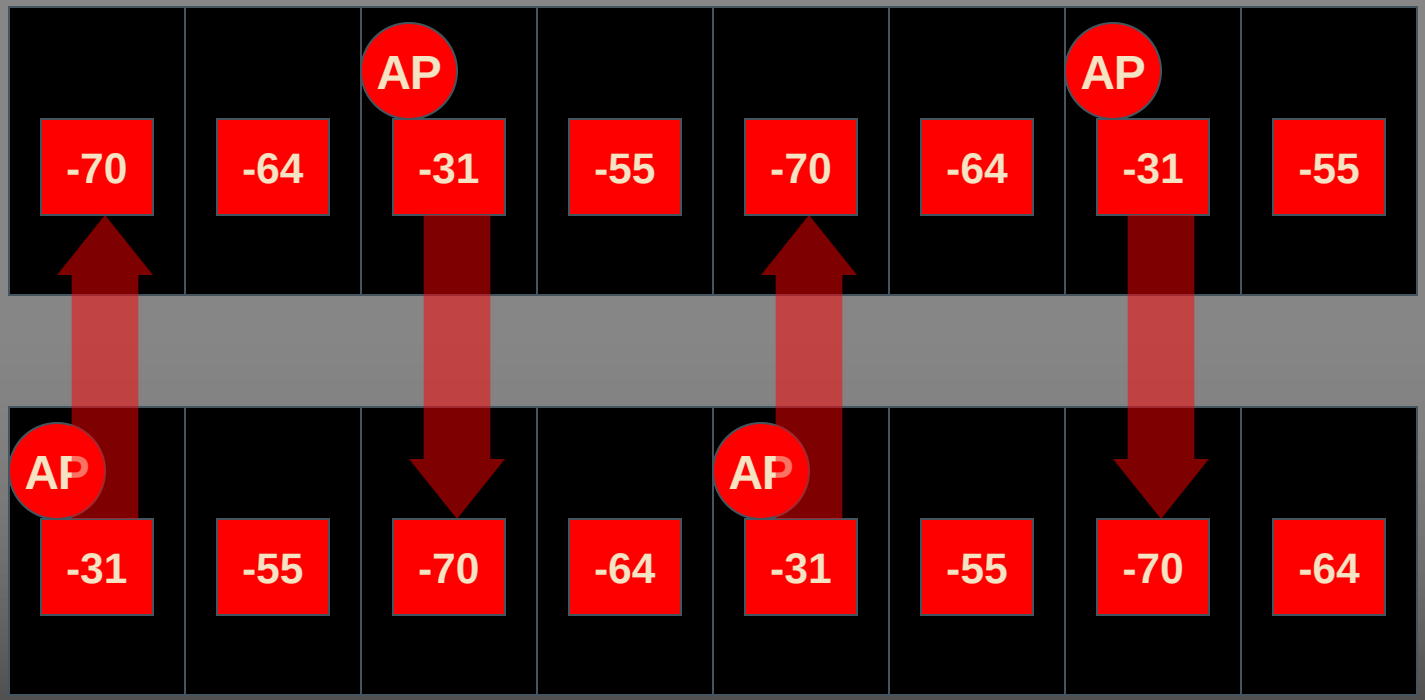
Actions:

- ***Place WP in one room, close the door***
- ***Measure signal in middle of each room***
- ***Identify room with signal of -90dBm***

Site Survey – Results

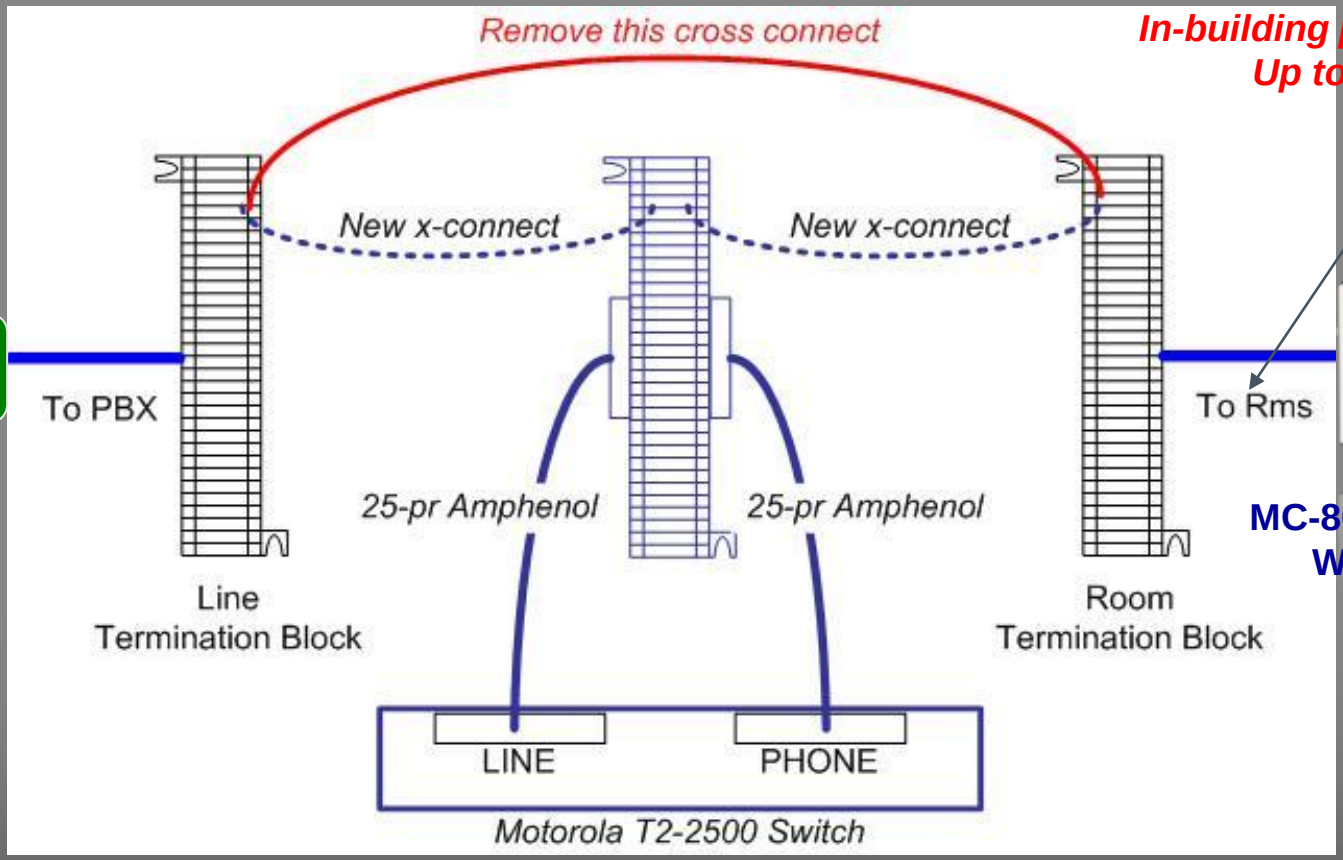
Results:

- ***Better than -70dBm signal in every room***
- ***No more than two APs on the same channel, interfering***



Phone Room Cross Connects

PBX



MC-802 wireless WallPlate

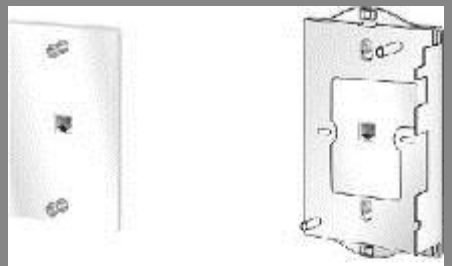
T3 PowerBroadband Switch

Note:

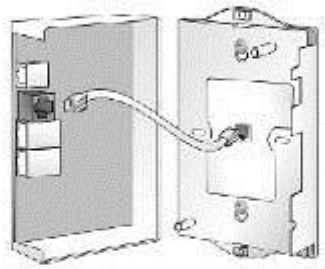
connect port labeled "phone" toward the house wiring

Guest Room Installation – M2 WallPlate

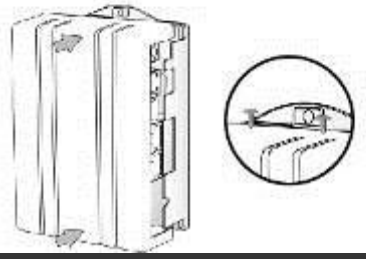
- **Step 1:** Install bracket over existing telco plate



- **Step 2:** Install 150mm RJ11 cable

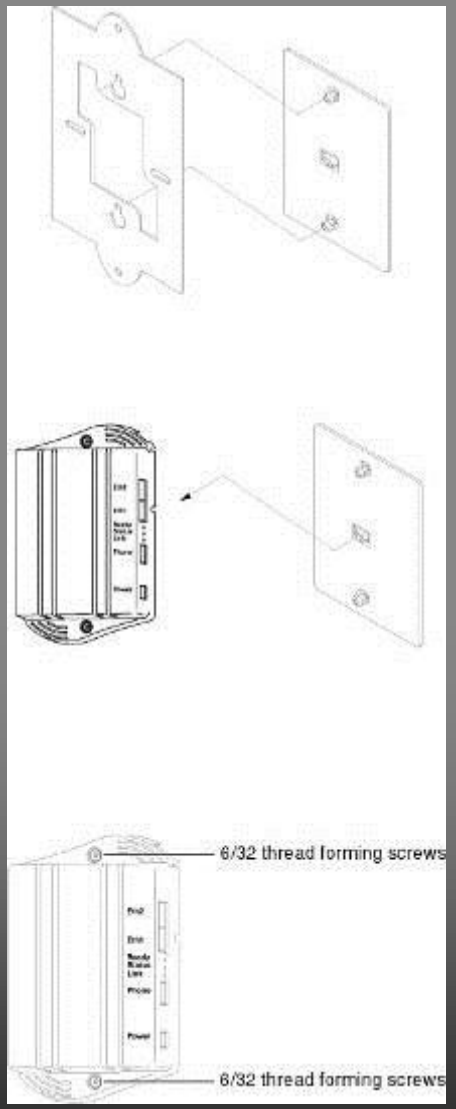


- **Step 3:** Snap cover in place
  Install 2 set screws if desired



Guest Room Installation – Wireless WallPlate

- **Step 1:** Install bracket over existing telco plate
- **Step 2:** Install 75mm RJ11 cable between existing RJ11 jack and backside of unit
- **Step 3:** Screw unit onto bracket using supplied screws



Thank You